



Biodiversity and natural resources

- New technologies in organic fruit production

BIO-INCROP



Title of the project: Innovative cropping techniques to increase soil health in organic fruit tree crops.





Introduction

The project will search new agro-management techniques for organic orchards. Research activity is planned in two climate zones of the Europe: Temperate tree fruit production regions, with apple crop as target and Mediterranean ones, with citrus crop as target. The research strategy is based on microbial components involved in soil suppressiveness and biological soil fertility.

The research actions are based on the exploitation of two categories of natural resources:

- Biological resources indigenous to soil system
- Natural resources exogenous to orchards

Background

The EU 27 trend of fruit production has decreased from 70 to 60 million tons during the period from 2000 to 2009. There are many causes of this yield decline, but the main reason is the decline of soil health due to the eco-functional intensification of growing areas specialising in fruit production. Replant disease, due to a series of soil borne pathogens, is the main biotic component of fruit tree decline. Microbial diversity, along with microbial biomass, represents the main component of soil suppressiveness: the natural ability of soil to control soil-borne pathogenic agents of replant disease.



Benefits of the project

The expected benefits are:

- New diagnostic tools for evaluating the actual occurrence of the biotic components of fruit tree replant disease.
- An increased use of indigenous or external natural resources for developing innovative management options aimed at increasing and preserving soil microbial biomass and diversity in organic fruit tree orchards.
- Integration of the national guidelines for certified organic production with agro-management strategies based on eco-functional intensification of organic cropping systems.
- Support for critical adoption by farmers of available organic amendments and bio-products and for developing practices aimed at increasing soil suppressiveness according to the available natural resources and environmental conditions.

Therefore the first users of the project results will be organic growers and agricultural extension services. The project results will represent a support to Regional and National Committees in improving protocols and guidelines in organic farming. Finally, the BIO-INCROP objectives represent added value to the organic food production for European consumers, who are receptive to strategies aimed at increasing biodiversity and preserving environmental safety.



Expected results

Expected outcome:

- Provide biological indicators for the replant disease in apple orchards
- Selecting soil amendments from waste-derived material and cover crops able to increase the beneficial microbial communities and reduce the aggressiveness of soil-borne pathogens causing replant disease
- Identification of new agronomic measures for reducing replant disease in pre-plant of new fruit tree orchards
- Innovative strategies for conversion of conventional citrus orchards to organic and for contrasting the natural soil degradation in organic citrus orchards
- Enrichment of the national guidelines for certified organic production with agro-management strategies based on eco-functional intensification of organic cropping system
- Filling the gap created by the marketing of bio-control agents, the lack of legislation and all of the unclear aspects surrounding bio-products for plant protection

Expected long-term impacts

BIO-INCROP project, aside from the new technical options and scientific results, is aimed to increase awareness of stakeholders that biodiversity has not only an impact on the environment's safety, but it is an important resource for developing ecologically friendly technologies for advances in organic farming.

Target groups

- Target groups of the project are:
- Organic Growers and Organic farmers associations
- Regional, National and European committees involved in setting guidelines in organic farming
- Students and Researchers
- Consumers













Diagnosis:

Main activities

Role of rhizosphere bacterial and fungal communities in plant health

Selection of naturally available resources to increase microbial diversity and biomass:

Compost and organic amendments

Project activities are organized as it follows:

I. Early evaluation in greenhouse bioassay

Cover crops and wild plants selected on basis of plant/microorganisms interaction

Survey of available means for controlling replant disease:

- Evaluation of biological active formulates
- Investigation of new low input agronomical options

II. Full field trials

These activities are aimed to investigate management strategies for controlling replant problems in degraded orchards. The Spanish partner (IVIA) will perform research activities for improving soil biological fertility and plant health in degraded citrus orchards and about conversion to organic of degraded citrus orchards. German (DLR), Austrian (HAID) and Italian (LRC) partners will focus on soil management and pre-plant combined treatments to minimize apple replant disease.

How to reach the endusers

The target groups will be reached trough:

- 1. technical and scientific publications;
- 2. a specific web site of the project, www.bio-incrop.org, on relationship between microbial diversity and soil health in agricultural soils;
- 3. communications at national and international congress of agronomy,
- 4. organic farming and crop protection;
- 5. technical meeting on organic farming at national and regional level.

Further information

This project is funded via the ERA-net CORE Organic II by national funds to each partner. CORE Organic II is a collaboration between 21 countries on initiating transnational research projects in the area of organic food and farming. In 2011, CORE Organic II selected this project and 10 more for funding.

Read more about the project at: www.bio-incrop.org or at the CORE Organic II website:

http://www.coreorganic2.org/BIO-INCROP and in Organic Eprints: http://orgprints.org/view/projects/BIO-INCROP.html



Coordinator

Senior Scientist Luisa Maria Manici, Agricultural Research Council, Italy E-mail: luisamaria.manici@entecra.it

Partners

Head of Department Markus Kelderer, Laimburg Research Centre for Agriculture and Foresty, Italy

Colaborador Científico Adjunto Rodolfo Canet, Instituto Valenciano de Investigaciones Agrarias, Spain

Manager Gerhard Baab, DLR Rheinpfalz, Center of competence, Germany

Researcher Thomas Rühmer, Landwirtschaftliches Versuchszentrum Graz-Haidegg, Austria

Researcher Ingrid Whittle, University of Innsbruch, Austria

PhD Andraes Naef, Agroscope Changins-Wädenswil Research Station, Switzerland Assist. Prof Hulya Ozgonen, University of Suleyman Demirel, Turkey