CORE organic II

Short description of project funded by CORE Organic II partners in the first call of CORE Organic II

Project short name and title

BIO-INCROP

INNOVATIVE CROPPING TECHNIQUES TO INCREASE SOIL HEALTH IN ORGANIC FRUIT TREE CROPS

Project summary

Multiannual crops such as fruit tree crops are affected by soil sickness or yield decline. “Replant disease” is the main biological component of this problem due to the eco-functional intensification of growing areas specialising in fruit production. The severity of this etiology is mediated by plant vigour, physiological state of plants and a-biotic factors, therefore its occurrence is actually an indicator for fruit growers of the degraded status of soil’s biological processes on his crops.

The project aims to develop innovative management options able to increase soil biological functioning, focusing the attention on soil suppressiveness: the natural ability of soil to control soil-borne pathogenic agents of replant disease. The activities are planned on two target crops: citrus and apple, representing two main agro-environments of Europe. Cover crops taken from local germoplasm collections or from the natural vegetative covers and recycled high quality organic materials are the natural resources upon which the project focuses, in order to develop innovative cropping practices which will enable soil biodiversity preservation and exploit its biological features.

The early evaluation of plant response and the use of advanced methodologies to evaluate microbial response toward the inputs are the strategies used to identify natural resources and techniques capable of increasing microbial biomass and diversity and selectively affecting beneficial and pathogenic microbial populations. The resulting innovative cropping practices are also easily transferred to other crops such as stone fruits and strawberries. Each country’s activities are planned in close cooperation with regional agricultural research centres working on organic farming and laboratories with specific expertise. The dissemination plan of the BIO-INCROP project should increase grower’s awareness of soil biodiversity as a resource for developing new technologies.

HYPOTHESES

- The enhancement of microbial biomass and biodiversity in agricultural soils increases biological fertility and soil health.
- Continuous crops such as fruit tree crops are affected by soil sickness, whose “replant disease” represents the main biological component. Replant disease is mainly caused by a series of non-lethal soil borne fungal pathogens
- The etiology of replant disease is mediated by plant vigour/growth stage and a-biotic factors, and tools for the correct diagnosis are lacking.
- The qualitative and quantitative response of microbial soil communities toward agro-management practices may be the clue for solving replant disease problems.

AIM

- An increased knowledge about agro-management practices based on the study of microbial factors involved in soil suppressiveness.

OBJECTIVES

- To elucidate the components of the root rot complex in apple and citrus growing areas representative of the main agro-environments of the Europe
- To provide applicative test and microbial indicators (greenhouse bioassay, biodiversity indicators) of replant disease occurrence.
- To develop innovative management options for organic fruit tree crops by selecting variable organic matter sources, wild and cultivated plants as cover/catch crops,
- To enrich the national guidelines for certified organic production with agro-management strategies based on eco-functional intensification of organic cropping systems.

To provide knowledge for supporting the critical adoption by farmers and local extension services of available bio-products (bio-pesticides, plant growth promoters or plant strengtheners, etc) and for developing low input practices aimed to control soil borne pathogenic agents of fruit tree "replant disease".

Expected results and their impact/application

- Biological indicators for the degradation status and risk for replant disease occurrence in the orchards
- Organic amendments and cover crops selected for increasing beneficial microbial communities and reducing the aggressiveness of soil borne pathogens towards the fruit crops.
- Identification of new measures for reducing replant disease, among those available in organic horticulture to be applied in pre-plant of new orchards
- Innovative strategies for the conversion of citrus degraded orchards to organic
- Innovative strategies combining tools and practices to reduce citrus and apple replant disease
- 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.

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