FOREST4EU

ITHub 5 – Agroforestry Systems

FOREST4EU partner: USC

OG: Operational group for the valorization of the Extremadura chestnut tree (CASTANEA)

OG's country: Spain

Type of Innovation: Process

Biological control of Chestnut blight (Cryphonectria parasitica) by virus infection (hypovirulence)

Introduction

Agroforestry with chestnuts is a traditional land use system in Northwest Spain where this type of trees are widely affected by the chestnut blight (Cryphonectria parasitica). This tree disease is characterized by affecting the aerial part of chestnut trees, destroying the tissues in the trunk and branches. Studies carried out within the framework of the CASTANEA operational group indicate that this chestnut disease is also a serious problem in some regions of Extremadura (southwest of Spain). Therefore, it is necessary to find effective methods of control for this destructive disease of chestnut trees.

Objectives

One of the objectives of the CASTANEA operational group was to design biological control strategies for chestnut blight disease with hypovirulent strains in different regions of Extremadura. In this context, it should be noted that hypovirulence is a condition in which the blight fungus itself gets sick by a virus (hipovirus CHV-1), which can be spread from one fungus to another.

Main results

The results of the CASTANEA operational group indicate that an effective protocol to carry out a biological control of the chestnut blight with hypovirulent strains in a specific area has to follow these phases: i) Determination of the Vegetative Compatibility Groups (VCG) present in the area through the sampling of affected trees, isolation of the fungus and analysis of the VCG in the laboratory, ii) Determination of the MAT types (mating types) present in the area because the presence of both MAT types can favor sexual reproduction, which complicates the establishment of hypovirulence, iii) Establishment of hypovirulent strains compatible with the VCGs in the area, which will be selected for their white colour and the presence of the virus will be confirmed with molecular analysis, iv) Production of the hypovirulent inoculum taking into account the VCG and MAT present in the area, v) Application of treatments in the field by bringing the hypervirulent strain into contact with the virulent one through scratches or perforations in the tree bark.

Figure 1: Biological control strategies for chestnut blight disease with hypovirulent strains in Extremadura, Spain.

Lessons learnt

1. The VCG present in chestnut plantations in Cáceres have been determined by the CASTANEA operational group. In the Villuercas-Ibores-Jara region there is a clear predominance of a VCG, while in the regions of Valle del Jerte and La Vera there is more diversity.

2. The MAT types present in the different areas have been determined by molecular analysis.

3. A hypovirulent strain of VCG predominant in the area (EU-11) has been detected by the CASTANEA operational group in Villuercas-Ibores-Jara.

4. Experimental treatments with hypovirulent strains are needed and for this reason a experimental treatment has been initiated by the CASTANEA operational group in Villuercas-Ibores-Jara region.

The information presented in this factsheet was developed by the FOREST4EU partner, drawing on the innovations and knowledge generated by the indicated operational group with their explicit authorization.

Further information

http://gocastanea.eu/

Funded by the European Union

Funded by the European Union (Grant n. 101086216). Views and opinions expressed are however those of the authors only and do not necessarily reflect those of the European Union or REA. Neither the European Union nor the granting authority can be held responsible for them.