New methods and technologies to prevent the replanting syndrome in apple trees

Summay

The renewing plantation in fruit trees is limited by replanting problems because is very difficult to obtain unplanted fields and the farmers need to reuse their irrigation systems and their fixed hail net structures. Apple replant disease is a significant impediment to the establishment of economically viable orchards, the trees have difficulty growing in the first years and fruit production is delayed. Apple replant disease is attributed to biotic and abiotic factors, it is highly variable by sites, making it difficult to diagnose and overcome. The proposed solution is experimenting with agricultural practices that preserve soil qualities and evaluating new rootstocks resistant against replanting.

Objectives

The main objective is to avoid the adverse effects caused by replanting. To reach this objective different practical methods will be used.
1.- Determine rootstocks less susceptible to apple replant disease.
2.- Develop a technology to carry out a successful preplant soil biofumigation.
3.- Improve the seed bed with mechanic methods, with compost amendments or with biological control agents.
4.- Encourage the root development with irrigation techniques.

Description of project activities

In this project different technologies will be evaluated separately: (1) tolerant rootstocks evaluation, (2) biofumigation with Brassicaceae and Gramineae species, (3) mechanic methods to improve the seed bed, (4) improve the nitrification process through the incorporation of organic matter and other techniques to increase the trees vigor, (5) biocontrol agents and biostimulants and, (6) irrigation management in post-planting period.
These techniques will be compared to standard system in experimental plots as in commercial orchards of the producers of the group

Final results and practical recommendations

Under the experimental conditions of the studies carried out in this project and as more outstanding results it can be concluded that:
1. G.11 and G.41 are new rootstocks that are slightly more vigorous than traditional M.9 and give good productivity and a good fruit size. This makes them more suitable for weaker varieties (such as Jerominecov) or for replanting situations.
2. The biofumigation carried out with the white mustard and turnip show a significant increase of vigor and height of the trees with respect to the control (without any previous plantation strategy).
3. The incorporation of fertilizers (monoammonium phosphate type) and organic amendments (vegetable soil, composted cattle manure) at the time of planting show a tendency to improve the growth of the trees with respect to the control (without any contribution).

Conclusions

With the most relevant results obtained the following recommendations can be given for new plantations in the replanting situation:
- Use more vigorous and more tolerant rootstocks than M.9, type G.11 and G.41.
- Use biofumigation
- Apply an organic amendment in the planting line
- It is advisable to apply brassicaceae seed meal (Biofence) although it is necessary to continue working to fine-tune the application method and required additional examination for extended periods to determine long-term impact on orchard productivity.

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Keyword-category

Agricultural production system
Farming practice

Territorial scope

Province	*County*
Lleida	Urgell
Girona	Solsonès
Barcelona	Segrià

Pla d'Urgell
Noguera
Garrigues
Baix Llobregat
Baix Empordà
Alt Empordà

Project dissemination *(publications, seminars, multimedia...)*

- 3 Reunions de la Comissió Tècnica de fruiters (Centrals fructícoles de Girona, ADV,s, IRTA Mas Badia i altres entitats).
- 1 Reunió dels membres del Grup Operatiu
- 5 Jornades tècniques
- 2 Publicacions tècniques
- 2 Publicacions a webs

Pàgina web del projecte

http://gironafruits.com/nous-metodes-tecnologies-evitar-sindrome-replantacio-pomeres/
www.irta.cat

Other project information

Projecte period

Starting date (month-year): Novembre 2015
End date (month-year): Setembre 2017
Project status: *Finalised*

Approved budget

Total Budget:	**142.401,39 €**
Funding source DARP:	*58.575,42 €*
Funding source UE:	*44.188,47 €*
Own funds:	*39.637,50 €*

With the support of:

Project funded by Operation 16.01.01 (Cooperation for innovation) of the Rural Development Program of Catalunya 2014-2020.

Basic regulation: Ordre ARP/258/2015, de 17 d'agost, per la qual s'aproven les bases reguladores dels ajuts a la cooperació per a la innovació a través del foment de la creació de grups operatius de l'Associació Europea per a la Innovació en matèria de productivitat i sostenibilitat agrícoles i la realització de projectes pilot innovadors per part d'aquests grups, i es convoquen els corresponents a 2015.

Id. projecte: 43 2015