Strategies for sustainably controlling *Monilinia* spp. in almond trees - MONCONTROL

Summary

Today, with the few substances with active fungicide authorised for almond cultivation, it is difficult to keep and manage diseases below the damage threshold. The main concern in the near future, when all the plantations that have been planted in recent years come into production, will be the high pressure of old and new diseases. Therefore, now is the time to work on developing more knowledge of these diseases in order to implement strategies to improve their management. This project will mainly address studies related to the control of *Monilinia* spp. and will specifically evaluate its dispersal capacity and the effect of environmental factors (abiotic factors) and variety (biotic factor) on its infectious process. To improve its control, different products with active fungicide, an assessment will be carried out of both synthetic and alternative, establishing their optimal time of application, as well as the study of different cultural practices complementary to fungicide treatments to reduce inoculum pressure in the field. Finally, with all the information provided by these studies, a strategy will be designed for sustainably controlling *Monilinia* spp. in almond trees.

Objectives

The main objective of the MONCONTROL project is to **design new control strategies against *Monilinia* spp. in almond trees**, applied to the field. The following specific objectives will therefore be considered:

- Complete the epidemiological studies of *Monilinia* spp. in almond trees, in order to design new control strategies
- Evaluate the effectiveness in the laboratory of different types of fungicides for controlling *Monilinia* spp.
- Evaluate in the field the fungicides with the best laboratory results and determine the optimal time of application of these products for controlling *Monilinia* spp.
- Identify and evaluate different cultural practices for inoculum reduction and disease control in the field
- Design a sustainable control strategy to reduce/minimise the incidence of *Monilinia* spp. in almond trees

Description of the actions carried out in the project

In order to achieve the above objectives, the following activities will be carried out:

- Activity 1. Epidemiological study of *Molininia* spp. in almond trees. Determine the distribution and presence of primary and secondary inoculum of *Monilinia Spp*. in almond farms located in Vall d'Ebre. The idea is that there will be sufficient information to establish the basis of a prediction model that indicates the risk of the disease.
- Activity 2. Studies to evaluate effectiveness in the laboratory of different fungicides for controlling *Monilinia* spp. in almond trees. Determine the control potential of the range of both synthetic chemicals and alternatives. Therefore, an extensive collection of information on possible products to be used for the controlling *Monilinia spp* will be carried out. The best performing products and/or those deemed appropriate will be tested in an in vivo laboratory study.
- Activity 3. Field trials to evaluate the effectiveness of the best fungicides and to determine the optimal timing of their application for controlling *Monilinia* spp. in almond trees. On the one hand, the effectiveness of different types of fungicide products previously evaluated in the laboratory will be evaluated at pilot level. In addition, the optimal timing of fungicide application will be evaluated.

- Activity 4. Field trials to identify and evaluate different cultural practices for the controlling *Monilinia* spp. in almond trees. This activity will evaluate different cultural practices to reduce primary and secondary inoculum of the disease. The incidence of the disease will be assessed at different times after the application of the products (April, May and June), in order to establish the initial and final impact.
- Activity 5. Design of a strategy for sustainably controlling Monilinia spp. in almond trees. This will involve evaluating the best strategies obtained during the previous activities. Therefore, the harvest of different farms treated with different parameters and conditions will be evaluated and the quality of the fruit will be assessed according to yield (%), kernel weight, among other chemical parameters.

During the implementation of the project there will be a transfer task which has not been identified as such but is described in the project and will be carried out as new results are obtained.

Final results and practical recommendations

The expected results of the implementation of this project are listed below:

- Determine the distribution and presence of primary and secondary inoculum of *Monilinia* spp. in almond farms located in Vall d'Ebre.
- Study of its distribution, field dispersion, the correlation with agro-climatic factors and the dependence of variety on the incidence of the disease
- Define a predictive model to determine the risk of the disease
- Determine the control potential of selected synthetic chemicals and alternatives against *Monilinia* spp. in almond trees
- Determine the effective dose of the selected product at the phenological stages of maximum susceptibility to *Monilinia* spp.
- Determine the effect of cultural practices on inoculum reduction and thus on the incidence of the disease in the field.
- Obtain an integrated and comprehensive strategy to improve the control of *Monilinia* spp. in almond trees.

Leader of the Operational Group

ORGANISATION: CRISOL DE FRUTOS SECOS, SAT

Coordinator of the Operational Group

ORGANISATION: IRTA - Institute of Agrifood Research and Technology

Other members of the Operational Group (grant recipients)

ORGANISATION: OCEAN ALMOND, SL

ORGANISATION: FRUITS SECS DE LES GARRIGUES, SCCL

ORGANISATION: BORGES AGRICULTURAL & INDUSTRIAL NUTS, SA

Other members of the Operational Group (not recipients of the grant)

ORGANISATION:

Subject area(s) of application

☒ Agricultural production system

☒ Agricultural practice

☐	Agricultural equipment and machinery
☐	Livestock farming and animal welfare
☒	Vegetable production and horticulture
☐	Landscape / Territorial management
☒	Pest and disease control
☐	Fertilisation and nutrient management
☐	Soil management
☐	Genetic resources
☐	Forestry
☐	Water management
☐	Climate and Climate Change
☐	Energy management
☐	Waste and by-product management
☐	Biodiversity and environmental management
☐	Food quality/processing and nutrition
☐	Supply chain, marketing and consumption
☐	Competitiveness and agricultural and forestry diversification
☐	General

Geographical area(s) of application

PROVINCE(S)	REGION(S)
Tarragona, Lleida	Baix Camp, Segrià

Dissemination of the project (publications, conferences, multimedia, etc.)

As the project develops, an activity will be carried out to disseminate the results obtained during the project in the fruit sector. The following actions are proposed in this regard:

1. Dissemination of the results at the Almond Tree Conference held by IRTA every year. An information capsule will be presented at the 2023 edition (a presentation of the project and actions to be carried out), and the main results of the study will be presented at the 2024 edition.
2. Dissemination of the results at the IRTA Fruit Conference. Presentation of the main conclusions. Presentation at the 2024 edition with the conclusions of the project after its completion.
3. Drafting of an informational article. Based on the results obtained, an article will be published in national journals in order to present these results to other companies located in other parts of the region.
4. Drafting of a scientific article. Based on the results obtained, a scientific article will be published to make the results available to the entire scientific community.
5. Digital dissemination on websites and social media

Project website

More information on the project

PROJECT DATES	TOTAL BUDGET	
Starting date: July 2021	**Total budget:**	€232,520.00
	DACC funding:	€94,118.40

Current status: Under way	**EU funding:**	€71,001.60
	Own funding:	€38,400.00

With funding from:

Project funded through Operation 16.01.01 (Cooperation for Innovation) through the Catalan Rural Development Programme 2014-2022.

Order ARP/113/2021 of 20 May, approving the regulatory bases for grants for cooperation for innovation by promoting the creation of European Association for Innovation operational groups in the areas of agricultural productivity and sustainability and the execution of innovative pilot projects by those groups, and Resolution ACC/1660/2021, of 27 May, announcing the call for the grant.

Generalitat de Catalunya
Departament d'Agricultura, Ramaderia, Pesca i Alimentació

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