

Characterisation and control of acid rot caused by *Geotrichum* spp. in peach trees in the Baix Segre region

Acronym: GEOPEACH

Summary

Over the last decade, many resources have been devoted to learning the epidemiology and how to control the rot caused by *Monilinia* spp., the primary pathogen affecting stone fruit, but the sudden emergence over the last 3-4 years of *Geotrichum* spp., which causes acid rot with rates of incidence that are in some cases even higher than *Monilia* spp., means that it is essential to study it at both a basic level, determining its epidemiology and the infectious process of the fungus, and in terms of measures for its control in the field and/or post-harvest that reduce its incidence as much as possible. In fact, no fungal treatment dealing specifically with this fungus is currently available, and although the effectiveness of some active substances has been reported in other countries, in Spain they are either not authorised for crops, or they have been used and are not very effective.

The emergence of this new scenario in which *Geotrichum* is becoming increasingly common is therefore a major challenge for companies in the sector, who will have to face a new enemy which has an unknown epidemiology, and with no known weapons to bring it under control.

While it is true that the source of an inoculum is in the field, it is post-harvest where its aggressiveness leads to most losses and claims. As a result, the financial impact of a shipment affected by acid rot that reaches the target market, e.g. containers that are exported to Brazil and the United Arab Emirates, is not only economically significant, but it also affects the customer's confidence, and has environmental implications.

Objectives

The overall aim is to obtain a better understanding of the infectious process of *Geotrichum* spp. in peaches, the factors affecting the spread of the disease, and the possible means to control it. The specific objectives are to:

1. Determine the presence and distribution of inoculums on stone fruit farms, and the effect of the factors involved in their infectious process.
2. Determine the presence and distribution of inoculums in various areas of the centre.
3. Determine which products are effective in controlling *Geotrichum* spp. to establish a control strategy.

Determine which post-harvest practices are effective in reducing inoculums in the centre, and in slowing the development of the disease.

Description of the measures planned in the project

The actions planned in this project are:

- Determine the presence and location of *Geotrichum* spp. on farms with a history of disease, sampling soil, leaves and fruit (sources of inoculum in the field). Collect isolates of *Geotrichum* spp. in the field.

- Determine the agrometeorological factors of each farm, and correlate them with the incidence of acid rot in the harvest.
- Study various factors involved in the infectious process at the pathogen and host levels: concentration of inoculums, production of pectinolytic enzymes, level of ripeness, etc.
- Determine the presence, location, and survival of *Geotrichum* spp. spores in the various environments and surfaces at the centre (sources of inoculums in the centre). Evaluate the effectiveness of various disinfectants at points where high levels of viability have been identified.
- Determine the real risk of infection at the centre by monitoring the acid rot in incoming goods *versus* manufactured products. Collect isolates at the centre.
- Evaluate the influence of conservation conditions (temperature and relative humidity) on the survival of *Geotrichum* spp. post-harvest.
- Determine the efficacy of synthetic fungicidal products and alternative products as regards isolates of *Geotrichum* sp. *in vitro* and *in vivo*.

Study the effect of storage conditions (normal cold, controlled atmospheres, and packaging of a finished product in a modified atmosphere bag) on the development of the disease.

Expected results and practical recommendations

The expected results of this project are:

- Determine the presence and location of *Geotrichum* sp. inoculum on farms, in order to focus on pre-harvest measures to reduce inoculum at the points where the pathogen is actually located.
- Study in depth the behaviour of *Geotrichum* spp according to various fruit ripening factors, agroclimatic factors, infectious factors, wounds, etc.
- Ascertain whether inoculums of *Geotrichum* sp. are present in the fruit and vegetable centre, in which areas or surfaces *Geotrichum* spp is able to survive and for how long in order to determine the critical points that need to be monitored to minimise the spread of the fungus at the centre.
- Determine the influence of post-harvest factors such as temperature and relative humidity that will help establish management protocols to reduce the development of the disease post-harvest.
- Produce a list of products effective in controlling *Geotrichum* spp., including both synthetic chemical fungicides and alternative products, in order to be able to design an on-farm and/or post-harvest control strategy.
- Determine the effectiveness of various disinfectants to reduce the inoculums of *Geotrichum* spp. that survive in the centre, in order to focus on the most appropriate cleaning and disinfection tasks for each area.
- Ascertain how conservation and packaging conditions affect the disease's development in infected fruit, in order to be able to guide the most appropriate type of conservation depending on the level of impact in a shipment.

Design a guide for good post-harvest practices to minimise acid rot losses during both storage and shipment of stone fruit.

Leader of the Operational Group

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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)
Lleida	Segrià

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

Based on the results of this project, and in order for those results obtained to benefit the participants and as many companies as possible, the actions will be divided into internal and external as follows:

INTERNAL ACTIONS (in the beneficiary companies in the Operational Group):

- Dissemination of the results to the companies participating in the project. This dissemination to companies will take place at various stages while the project is being undertaken in order to maintain fluid and continuous communication between the companies and the technology centre. The subjects to be covered will be both the presentation of results and the planning of the tests to be carried out.

EXTERNAL ACTIONS (open to the general public):

- Dissemination of the results in the Post-harvest Seminar which takes place at the IRTA-Fruitcentre facilities in May every year. A presentation will be made at the 2020 event (a presentation of the project and actions to be carried out), and the main results of the study will be presented at the 2021 event. Around 100 people from the entire sector will attend this seminar.
- Drafting of a dissemination 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 country.

Project website

Not planned.

More information on the project

PROJECT DATES	TOTAL BUDGET
Start date (month-year): July 2020	Total budget: €91,319.00
Completion date (month-year):	DARP funding: €37,320.18
Current status: Underway	EU funding: €28,153.82
	Own funding: €25,845.00

With funding from:

Project funded through Operation 16.01.01 (Cooperation for Innovation) through the Catalan Rural Development Programme 2014–2020.

Order ARP/133/2017 of 21 June, 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 ARP/1531/2019, of 28 May, announcing the call for the grant.



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