VIRTIGATION – Emerging viral diseases in tomatoes and cucurbits: implementation of mitigation strategies for durable disease management

Funding program: Horizon 2020

Type of action: Research and Innovation Action

Start: 01/06/2021

End: 31/5/2025

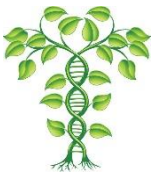
EU contribution: 6.998.668,34

Project website & Contact : www.virtigation.eu & virtigation@rtds-group.com

Summary

Tomatoes and cucurbits (i.e. cucumber, melon, pumpkin, zucchini and gourds) are among the most produced fruits and vegetables in the world, but are increasingly under threat by emerging viral diseases caused by begomoviruses (whitefly-transmitted) and tobamoviruses (mechanically transmitted). To date, there are only limited bio-based remedies on the market to tackle the devastation caused by these plant diseases. Therefore, the VIRTIGATION project will develop a broad range of solutions, including vaccines for the plants, biopesticides against virus vectors and Integrated Pest Management (IPM) strategies, to tackle these aggressive viruses.

Co-creation with stakeholders



Innovative diagnostic tools

Plant-virus-vector interactions

Viral disease spread under climate change

Integrated virus and vector management

Train the value chain

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000570

Objectives

VIRTIGATION's strategic objective of developing rapid and long-lasting solutions to combat emerging viral diseases in tomatoes and cucurbits will be implemented through six specific objectives:

1. Knowledge sharing and engagement of stakeholders in research activities;
2. Develop robust diagnostic tests, quarantine measures and identify ecological factors driving disease outbreaks;
3. Understand plant-virus-vector interactions;
4. Develop IPM solutions;
5. Identify and pyramid natural resistance to viral diseases and vectors;
6. Train the tomato and cucurbit value chains;

Expected impacts

In the long-run, VIRTIGATION aims to reduce tomato and cucurbit crop losses stemming from viral diseases by up to 80%. Moreover, the project seeks to cut in half the use of chemical pesticides as mitigation measure to control viruses and their vectors. Its main expected impacts are to:

- Enable understanding of the drivers of plant virus emergence and spread, including the impacts of climate change, with a novel analysis tool – the Genome Detection Platform -, and the development of an emerging virus warning app;
- Create tools to prevent, detect and control plant diseases, including through diagnostic tests, online tracking and tracing and full genome sequencing – "test, track and trace";
- Develop systemic, environmentally friendly and long-lasting solutions to control both viruses and their vectors, in line with the principles of IPM;
- Reduce economic, social and environmental losses for European agriculture and horticulture, by training the tomato and cucurbit value chains in using virus- and vector-control measures, such as resistant plant varieties, vaccines and disinfection;
- Support EU plant health data management and policies, by creating a network on emerging plant virus detection – the VIRTIGATION network -, and providing knowledge exchange and advisory tools to stakeholders through National Knowledge Brokers (NKBs);

Multi-actor project

As a Horizon 2020 multi-actor project, VIRTIGATION will engage in a bottom-up approach to tailor its innovative solutions to the needs of the value chain. It will collaborate with key players such as growers, research centers and seed and plant protection industries. VIRTIGATION will enable these key actors to co-design its research activities, and train them in applying its developed bio-based

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000570

remedies. Through its multi-actor approach, VIRTIGATION will gather national know-how through the coordination efforts of its expert NKBs, and foster cooperation between partners in Europe, Israel, Morocco and India to combat the emerging viral diseases affecting tomatoes and cucurbits.

Consortium

VIRTIGATION brings together 25 partners from academia, industry, research & technology organizations, agricultural extension services and SMEs from 12 countries: Belgium, Spain, Luxembourg, UK, Italy, the Netherlands, France, Germany, Austria, Israel, Morocco and India.

- KU Leuven (Belgium)
- DCM NV (Belgium)
- TECNOVA - Fundacion para las tecnologias auxiliares de la agricultura (Spain)
- LIST - Luxembourg Institute of Science and Technology (Luxembourg)
- National Resources Institute - University of Greenwich (United Kingdom)
- CSIC - Consejo Superior de Investigaciones Cientificas (Spain)
- CRAG - Centre de recerca en agrigenomica CSIC-IRTA-UAB-UB (Spain)
- Università degli studi di Catania (Italy)
- Wageningen University (Netherlands)
- Stichting Wageningen Research (Netherlands)
- Institut national de recherche pour l'agriculture, l'alimentation et l'environnement (France)
- EMWEB (Belgium)
- The Agricultural Research Organisation of Israel – The Volcani Centre (Israel)
- Proefcentrum Hoogstraten (Belgium)
- Association Provençale de recherche et d'experimentation legumiere (France)
- Julius Kühn-Institut Bundesforschungsinstitut für Kulturpflanzen (Germany)
- Syngenta France SAS (France)
- Scientia Terrae (Belgium)
- Huerta Valle Hibri2 SL (Spain)
- Agencia de gestion agraria y pesquera de Andalucia (Spain)
- Landwirtschaftskammer Nordrhein-Westfalen (Germany)
- STE Maraissa SA (Morocco)
- RTDS Association (Austria)
- Corteva Agriscience Italia SRL (Italy)
- International Partner: University of Agricultural Sciences Bengaluru (India)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000570

Project coordination

VIRTIGATION is led by the Laboratory for Tropical Crop Improvement - Department of Biosystems at the KU Leuven university in Belgium. The VIRTIGATION project coordinator is Hervé Vanderschuren, Professor of Tropical Horticulture.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000570