



P R O J E C T S

Validation of an Automated Aphid Warning System

Project information

Project title: *Validation of an automated aphid warning system*

Duration: *7 months, from June 2023 to December 2023*

Project No.: *KVW-00693*

Funding Agency: *Co-funded by the European Union, Kansen voor West II - European Regional Development Fund*



Co-funded by
the European Union



Kansen voor West II



Introduction

The number of infections with the potato virus PVY in Dutch seed potatoes has been increasing rapidly. In 2014, 7% of potatoes were rejected because of the virus and in 2020 this number was above 30%. Aphids are the most important vectors of the virus. In sugar beets and bulbs, similar increases in aphid-borne viruses exist. The number of restrictions on applying insecticides is increasing and the long-term goal of the EU is to minimize the use of pesticides even further. This expected decrease in possibilities to apply pesticides will increase the risk of aphids spreading viruses. It is therefore most important that the monitoring of aphids gets intensified in order to find the optimal time for a defense action and also to understand aphids' ecology and behavior in more detail.

The iSCOUT® color trap is a field device consisting of a camera mounted in front of a sticky trap. A couple of times a day this camera makes a picture and sends this image to a central server. The image is automatically analyzed and the number of insects are counted. Only insects of a certain size are detected, if an insect is too small it won't be recognized. Aphids used to be too small to be detected, but due to the work done for the R&D voucher, Pessl Instruments received in 2021, 'Automatic aphid detection in potato fields' the iSCOUT® Color trap can now recognize and count aphids on yellow sticky plates.

The project comprises two parts. In the first part the iSCOUT® Color trap is validated next to standard-used methods to monitor aphids. In the second part, the trap is better optimized for aphid catching while catches of other biodiversity are reduced.

Workplan

Work package 1: iSCOUT® validation

1. In order to compare methods, 6 pairs of traps (an iSCOUT® and a pan trap) will be placed in the Netherlands. The goal is to determine if the iSCOUT® Color trap could replace pan traps to monitor aphids.
2. Each pair of traps will be accompanied by a weather station that can be mounted on the iSCOUT® to establish correlations between weather parameters and aphid counts.
3. The total number of aphids will be recorded weekly throughout the year.
4. The traps will be placed at different locations in the Netherlands to ensure large variation in weather data and aphid population dynamics.
5. Data on aphids will be collected to optimize the detection algorithm.

Work package 2: Trap improvement

1. The previous study demonstrated promising trap-specific effects on other insects (flies and butterflies) resulting in increased the iSCOUT's sensitivity. The goal is to enhance a trap that is strongly attractive to aphids but not to other insects.
2. Since there was no clear aphid abundance peak in 2022, additional replicates will be tested during this project.
3. Designs to increase catch rate based on wind direction will be developed and tested in the field.
4. New designs to attract aphids to the trap, based on translucency and printing on the sticky plate, will be created and tested in the field.
5. Besides additional designs and adjustments, testing will be conducted to determine whether more aphids are caught in lee wind or in the full field.

Partners



Pessl Instruments GmbH (<https://metos.at/>)

Pessl Instruments GmbH, located in Weiz, Austria, has been producing reliable measuring instruments for 38 years. It is specialized in the development of innovative products in the field of agricultural monitoring and precision farming. Pessl Instruments has developed various devices for the measurement and monitoring of different agricultural parameters. More than 41,000 stations in 86 countries from all over the world have been supplied with Pessl Instruments's products by more than 150 distribution partners. Pessl Instruments has 60 employees, developing and manufacturing high-quality products and organizing worldwide marketing and sales.

The instruments of Pessl Instruments are available under their own brand name, METOS® by Pessl Instruments. The instruments are used in a variety of fields, from agriculture to logistics, from research to large companies. Based on the Pessl Instruments chain interface, the connection of various sensors is possible.

Given Pessl Instruments's extensive experience in research, technology development, prototype manufacturing, and testing, as well as a technical and economic assessment of innovative

technologies, the company offers the right skills, knowledge, and infrastructure to support the Automatic aphid detection in potato fields project.

Pessl Instruments is one of the leading IoT providers for agriculture offering innovative and cost-effective solutions for more efficient farm management. Participating in the Automatic aphid detection in potato fields project gives Pessl Instruments a chance to put into the farmer's disposal all its expertise on sustainable agriculture and fulfil its mission to offer high added value and customized cost-effective solutions and contribute to global environmental protection.



Stichting Wageningen Research Institute (<https://www.wur.nl/en.htm>)

Wageningen University & Research is a collaboration between Wageningen University and the Wageningen Research foundation.

'To explore the potential of nature to improve the quality of life'

That is the mission of Wageningen University & Research. Over 6,800 employees and 12,900 students from more than hundred countries work everywhere around the world in the domain of healthy food and living environment for governments and the business community-at-large.

The strength of Wageningen University & Research lies in its ability to join the forces of specialised research institutes and the university. It also lies in the combined efforts of the various fields of natural and social sciences. This union of expertise leads to scientific breakthroughs that can quickly be put into practice and be incorporated into education. This is the Wageningen Approach.

The scientific quality of Wageningen University & Research is affirmed by the prominent position we occupy in international rankings and citation indexes.

The domain of Wageningen University & Research consists of three related core areas:

- Food, feed & biobased production
- Natural resources & living environment
- Society & well-being