



## Revolutionary new tool for onion growers to manage pests and disease

A national program of research, development and extension is revolutionising the way growers can detect the presence of airborne pests and diseases across multiple agricultural sectors, including horticulture, viticulture, grains, cotton, sugar, and forestry.

iMapPESTS uses a range of surveillance, diagnostics, and engagement and adoption activities that together aim to enhance pest management and decision making through the provision of timely information on high priority, cross-sectoral pest and disease abundance and spread.

Led by Hort Innovation, iMapPESTS is funded through the Australian Government Department of Agriculture, Water and the Environment as part of its Rural R&D for Profit program, with contributions from 17 partner organisations including Plant Health Australia.

### *How does iMapPESTS work?*

Mobile surveillance units, called 'Sentinels' are custom built, using specialised trapping technology, to monitor for the presence of high-priority pests and diseases.

Samples captured by the Sentinels are analysed using morphological identification and advanced molecular diagnostic tools to rapidly detect & quantify high-priority pests and diseases. Pest and disease data is then fed into a secure cloud space where it is integrated with environmental data (temperature, humidity, wind speed & direction). Surveillance findings are summarised on the iMapPESTS website for growers, agronomists & consultants to explore & access timely, accurate information to make decisions on-farm

Rohan Kimber who works with the South Australian Research and Development Institute (SARDI) is the lead research scientist in the development, design, and construction of the sentinels.

"iMapPESTS is revolutionising the way we gather information on pests and diseases and communicate that information to growers and consultants.

"The program centres around the trapping units which in practical terms enables the detection of airborne pests and diseases in a region or specific site as well as take into consideration the conditions at the time.



## CASE STUDY

“The end game is to have growers and consultants able to access actionable data that will inform their integrated pest management, and can also include the presence of beneficials, so providing a bigger picture of a region’s biodiversity,” said Dr Kimber.

As sentinel units are developed and rolled out in trials across the country, Dr Kimber and the team of entomologists at SARDI are identifying priority pests captured by the Sentinels using traditional morphological techniques.

“I’m also involved in SARDI’s Molecular Diagnostics Centre where the importance of diagnostics comes into play. Here we identify and quantify high priority fungal pathogens captured by the Sentinels’ high-volume air samplers which are then reported to industry,” Dr Kimber said.

Another partner in the delivery of iMapPESTS and with a focus on diagnostics is Agriculture Victoria who are taking a different approach and developing cutting edge diagnostic capability using Next Generation Sequencing (NGS).

NGS technologies can be used for the detection of known pests and diseases as well as being a tool to detect “unknowns”, which will be particularly useful in mixed population samples captured by the Sentinels. This research will establish an NGS pipeline (samples collected in-field through to analysis) that will be made available to industry, as well as state and federal governments, on a fee-for-service basis that is affordable.

Shakira Johnson works with AUSVEG and is charged with communication and extension for iMapPESTS.

“Since the launch of iMapPESTS, feedback has been very encouraging. We’ve been able to adapt our approach following engagement with growers, which included revisiting the construction of the Sentinels to reduce costs.

“We’ve implemented a series of trials across various geographical regions which will be further expanded as 2021 progresses.

“Growers and industry groups from multiple agricultural sectors, including horticulture, viticulture, grains, cotton, sugar, and forestry will be able to experience the Sentinels in action and gain a deeper understanding of the technology and how it can assist their productivity and profitability when it comes to managing pests and diseases,” said Ms Johnson.

For onion growers, the trial conducted late last year at Thorndon Park Produce in the intensive vegetable cropping region of Virginia, South Australia provides a great example of the benefits of the iMapPESTS surveillance system in early detection of pests and disease.

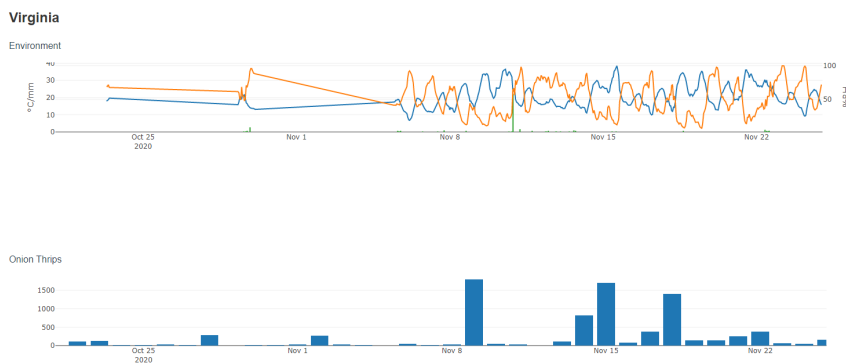
Sentinel 4, which is smarter, smaller, lighter and more flexible compared with the earlier sentinels developed was used at the site and featured one two-metre insect suction trap and one spore suction trap, as well as an onboard weather station. This site also collected data for targets captured by lure-based traps.



# CASE STUDY

The insect pests targeted at the site of interest to onion growers included Onion thrips (*Thrips tabaci*), Green mirid (*Creontiades dilutus*) and Green vegetable bug (*Nezara viridula*). In terms of fungal pathogens targeted, Sclerotinia white rot (*Sclerotinia minor* & *S. sclerotiorum*) was detected.

The dashboard for the trial, which can be found on the iMapPESTS website <https://imappests.dtfx.com.au/sites/virginia/> shows the total number of onion thrips counted in collected samples from the 2 metre trap as data becomes available. Weather data is captured and presented in real time on the data dashboard.



The dashboard uses a check-box system to select for specific insects and pathogens, meaning growers can see the level of incursion at a trial for pest and diseases known to impact the onion industry.

Trials using the iMapPESTS surveillance system will continue to roll out during 2021, with locations including western Victoria, the NSW Riverina and Northern Rivers, Lockyer Valley and Cairns in Queensland all scheduled to host Sentinel units.

Growers should visit [www.imappests.com.au](http://www.imappests.com.au) for more information and to follow the trials taking place. Following the trial period, it is envisaged that consultants and industry groups may collaborate to utilise the Sentinels and help determine integrated pest management techniques for Australia's agricultural sector to boost productivity and profitability.

## MORE INFORMATION:

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April 2021