Project title:	Improved management of bacterial diseases of horticultural crops
Project number:	CP 191
Project leader:	Dr S J Roberts, Plant Health Solutions Ltd
Report:	Annual Report, October 2021
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Key staff:	Dr S J Roberts, Plant Health Solutions Ltd Dr Lauren Branfield, Stockbridge Technology Centre
Location of project:	Warwick, Cawood, various grower sites
Industry Representatives:	Rob Richardson, Johnson's of Whixley Richard Haacker, East of Scotland Growers
Date project commenced:	01-Oct-2019

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The results and conclusions in this report are based on an investigation conducted over a one-year period. The conditions under which the experiments were carried out and the results have been reported in detail and with accuracy. However, because of the biological nature of the work it must be borne in mind that different circumstances and conditions could produce different results. Therefore, care must be taken with interpretation of the results, especially if they are used as the basis for commercial product recommendations.

AUTHENTICATION

We declare that this work was done under our supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

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GROWER SUMMARY

Headline

High-health planting material produced with sub-irrigation has shown a significant benefit in terms of both disease levels and crop yield.

Background

There are more than 100 known bacterial plant pathogens that affect, or could potentially affect, UK crops. Despite much previous research, diseases caused by bacterial pathogens continue to cause economic losses to growers, particularly in field vegetables, hardy nursery stock and protected ornamentals. The options for control with plant protection products have always been limited, and it is likely that this will continue. For the majority of bacterial plant diseases the primary source of infection is likely to be the seed or propagation material. The use of clean starting material provides the best prospects of long-term sustainable control of bacterial pathogens in horticultural crops; the exclusion of the pathogen through the use of clean starting material avoids the need for secondary interventions with e.g. Plant Protection Products etc. This is a collaborative project between Plant Health Solutions (PHS), Stockbridge Technology Centre (STC), Warwick Crop Centre (WCC) and growers and will primarily focus on developing best practice for the deployment of such a strategy. For a number of high priority model bacterial pathogens the prevalence of the pathogen in starting material will be determined, the benefits of clean starting material will be demonstrated, and epidemiological data obtained to set health standards for starting material. We will also examine the feasibility of novel methods to produce high-health planting material as a second-line defence, and examine the potential for resistance deployment where we think this may be feasible. This report covers the second year of the project.

Summary

Brassicas and Black Rot

- Further seed testing has identified additional seed lots infested with Xanthomonas *campestris* pv. *campestris* (Xcc)
- *Xcc* was detected in several batches of transplants.
- More than 30 crops/locations have been walked/examined and levels of black rot assessed. High levels of disease were associated with known infested seed lots or transplants,

- High-health transplants gave a benefit in terms of both disease levels and yield, despite being surrounded by an infected crop.

Broccoli spear rot

- Despite inoculation with pathogenic strains, no disease developed in the resistance screening trial.
- We were able to demonstrate both seed to seedling transmission and spread during plant-raising.

Coriander and parsley bacterial blight

- We were unable to isolate any specific bacterial pathogen from parsley samples.

Cherry laurel and bacterial shot-hole

- Cv Otto Luyken has been successfully established in tissue-culture, with reasonable multiplication rates. A batch of plants was transferred to a commercial tissue-culture company for further multiplication and were successfully weaned.

Hardy Geraniums and Xanthomonas leaf spot

- *Xanthomonas hortorum* pv. *pelargonii* (*Xhp*) was detected in several batches of plug plants.
- As well as introduction with propagation material, it would appear that spread of disease amongst batches of plants of different ages may be important for epidemic development on the nursery,
- Further investigation of the detection method, suggests that false-negatives may be an issue.
- A spread experiment is underway to provide data for use in setting health standards.

Hedera and Xanthomonas leaf spot

- *Xanthomonas hortorum* pv. *hederae* (*Xhh*) was detected in several batches of liners at the point of delivery to the nursery.
- A spread experiment is underway to provide data for use in setting health standards.

Novel Production System

- The sub-irrigation system trialled last year was scaled-up.

- Transplants were again raised successfully and both plant-raiser and grower were happy with the quality of the plants.
- The trial system needed less watering and feeding than conventional production.

Financial Benefits

At the present time, no specific financial benefits have been identified.

Action Points

Growers should question suppliers of seed and young plants on the health standards that have been applied and request assurances that those standards have been achieved.

It is essential to quarantine and check bought-in plant material carefully and if necessary consider additional laboratory testing.