Grower Summary

CP 140

OPTIMISING THE USE OF BIOCONTROL AGENTS TO IMPROVE THE CONTROL OF *B. CINEREA* IN KEY VEGETABLE AND FRUIT CROPS

Final Report 2019

Project title:	OPTIMISING THE USE OF BIOCONTROL AGENTS TO IMPROVE THE CONTROL OF *B. CINEREA* IN KEY VEGETABLE AND FRUIT CROPS
Project number:	CP140
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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.]

GROWER SUMMARY

Headline

The third year of the PhD project focused on characterising the effect of climatic factors on temporal population dynamics of the two commercial biocontrol agents (BCAs) (*B. subtilis QST 713* and *G. catenulatum J1446*) on lettuce and strawberry plants. We identified conditions suitable for phyllosphere establishment of the two BCAs, which can be used to optimise BCA application.

Background

BCAs are living organisms and as with every organism reproduction is critical to its survival. Understanding how environmental conditions affect survival, reproduction, and dispersal is crucial to maximise biocontrol efficacy. The overall aim of the study is to obtain ecological knowledge on BCAs available in the UK and utilize the knowledge to produce strategies for effective application of such BCAs to improve control consistency and efficacy against *B. cinerea* on lettuce and strawberry crops.

Summary

Establishing how abiotic factors influence the two BCAs temporal population dynamics is important to optimise their use on the two crops allowing successful colonisation. All the tested abiotic factors of temperature, relative humidity (RH) and dew point effected viable BCA population overtime, but the relationship between the BCAs and these factors in the phyllosphere was complex.

The viable population of the BCAs was monitored with the developed PMAxx^{TM}-qPCR method. Increasing temperature led to population survival and reproduction up to the optimum growth temperature under healthy plant transpiration rates (i.e. release of water through plants aerial parts at an appropriate rate in which the plants are not over or under transporting water) for the two BCAs on both crops. Increasing RH allowed population survival and reproduction especially in sub-optimal and optimal growth temperatures. The bacterial BCA thrived better in higher dew points, while the fungal BCA preferred lower dew points. The two BCAs can survive at least up to ten days in both crop systems, though the absolute viable population size decreased significantly in some conditions. There results can assist in the development of strategies for better timing of applications of BCAs to increase their survival and hence biocontrol efficacy. Currently we are developing mathematic models to capture such ecological knowledge of the two BCAs.

Financial Benefits

The knowledge can be used to increase the effectiveness of Serenade and Prestop against botrytis.

Action Points

Consider climatic conditions when applying Serenade and PreStop to improve their establishment.