

Grower Summary

FV 417

Use of Plant Defence
Elicitors to Provide Induced
Resistance Protection in
Brassica and Allium Crops

Annual 2014

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Before using all pesticides check the approval status and conditions of use.

Read the label before use: use pesticides safely.

HDC is a division of the Agriculture and Horticulture Development Board.

Project Number:	FV 417
Project Title:	Use of Plant Defence Elicitors to Provide Induced Resistance Protection in Brassica and Allium Crops
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Further information

If you would like a copy of this report, please email the HDC office (hdc@hdc.ahdb.org.uk), alternatively contact the HDC at the address below.

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GROWER SUMMARY

Headline

- Plant defence elicitors have the potential to aid in the treatment and control of bacterial and fungal diseases of Brassica and Allium species.
- Initial trials show positive results for two elicitors in control of leaf blight (Pca) in radish and black rot (Xcc) in cabbage.
- Some elicitors increased head-weight of broccoli, coupled with presence of hollow-stem disorder.
- Trials on Brussels sprout varieties at two sites show that elicitors reduce severity of Light Leaf Spot significantly and two elicitors in particular, Bion® and Regalia®, show the most promise.

Background

Brassica and Allium crops suffer from a number of important fungal and bacterial diseases. Bacterial pathogens are a serious concern because available control options are very limited in choice and their efficacy depends on appropriate application. Trials have been initiated to test whether plant defence elicitors can be used to provide protection against bacterial and fungal pathogens in five different horticultural crops for commercially important diseases. The Brussels sprout area in the UK in 2011 was 3,045ha, with the 45,000 tonnes produced having a farmgate value of £41 million (Basic Horticultural Statistics 2012). The disease Light Leaf Spot (LLS) (*Pyrenopeziza brassicae*) is a particular problem in the wetter north of England and in Scotland, and has become established further south in Nottinghamshire and Lincolnshire. It is estimated that annual losses due to LLS are in the region of 10-15% or around £4-6 million.

Head rot is a major disease of broccoli (*Brassica oleracea* L. var. *italica* Plenck) that can cause 30-100% crop losses, estimated to cost the UK industry £10-15 million annually - up to 30% of the market value (Harling & Sutton, 2002). The disease is caused by the soft rotting bacteria, predominantly *Pseudomonas fluorescens*, *Ps. marginalis* and *Pectobacterium carotovorum* (Cui & Harling, 2006). Previous work (FV 378) tested whether plant defence elicitors were able to reduce or prevent head-rot symptoms in a broccoli trial and indicated that application of some combinations could reduce the incidence of symptomatic disease. Black Rot is a major bacterial disease of cabbage throughout the world and can cause significant losses in UK winter cabbage, with Savoy and Savoy x White hybrids particularly

susceptible. The disease is probably introduced by infected seed and is now endemic in production fields in these areas and although the preventative use of copper and strobilurin fungicides can minimise disease outbreaks there is little that can be done to control established disease. Winter cabbage area in the UK is around 2,900ha, producing around 147,000 tonnes with a farmgate value of £54 million (Basic Horticultural Statistics 2012). It is estimated that severe disease outbreaks in some years can lead to production losses amounting to 15-20% or £7-10million.

The radish production in the UK is ~ 5800 tonnes, with a market value of ~ £11 million. Approximately 15% of the production is sold as a bunched product, and although radish leaves are not intended for consumption, there has been an increase in demand for radish bulbs sold in bunches with the leaves attached. The presence of bacterial blight and development of scorched-leaf symptoms caused by *Pseudomonas* species renders the crop unmarketable, despite the absence of disease symptoms on the roots. The disease has been observed in crops over the past few seasons particularly during spells of wet weather. It has been estimated that during a high infection period there could be up to 6% losses.

Summary

The initial trials have shown some promising results for the application of elicitors to control bacterial and fungal pathogens of brassica and allium species. Year two of the project aims to repeat these trials.

Trials at two sites using early, mid- and late-season Brussels sprout varieties demonstrated that a range of elicitors reduced LLS severity substantially on leaves and sprouts. Of particular interest was the elicitor Bion®, which used either on its own, or in combination with the elicitor Regalia®, gave significant reductions in LLS severity when applied just 3 times during the growing season.

Glasshouse trials on radish showed a significant reduction in the severity of *Pseudomonas cannabina* pv. *Alisalensis* (Pca) associated leaf blight symptoms, following application of SitKO-SA on var. Celesta. Trials on cabbage showed a significant decrease in Xcc-associated symptoms for Harpin-treated plants compared to the other treatments, although the difference was not significant when compared to the fungicide-treated control. Some elicitors increased the yield of broccoli, although this tended to correlate with an increase in hollow-stem disorder.

Year 2 of the project aims to repeat the initial findings. It is anticipated that elicitors will be most useful as part of an integrated disease management programme.

Financial Benefits

There are no financial benefits, as yet, from this project.

Action Points

Action points will be developed once the project has been completed at the end of year 2.