

## Final Project Summary

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|--|---|-----------------------------|-------------------------------|
| <b>Project title</b>                       | Development of UK wide risk forecast scheme for Ramularia Leaf Spot in barley |                             |                               |
| <b>Project number</b>                      | 214-0016  | <b>Final Project Report</b> | PR600 (21120009)              |
| <b>Start date</b>                          | 1 <sup>st</sup> September 2014  | <b>End date</b>             | 31 <sup>st</sup> January 2018 |
| <b>AHDB Cereals &amp; Oilseeds funding</b> | £74,698   | <b>Total cost</b>           | £74,698                       |

### What was the challenge/demand for the work?

Ramularia leaf spot (RLS) is now a major economic pathogen of barley in the UK reducing both the yield and quality in winter and spring crops. In the absence of complete varietal resistance, control has been based on the judicious use of chemicals. Symptoms generally appear after flowering in the crop so fungicides have to be applied prophylactically. In the absence of a risk forecast for the disease farmers have no information to use when deciding on the level of fungicide input required to protect their crops during the vital grain filling period.

The challenge of this work was to provide growers with a robust forecast of the potential risk to their barley crop from RLS. Previous work has indicated a link between environmental conditions in the crop around the start of stem extension and final disease levels. A regional forecast system had been used in Scotland for a number of years but no information was available to farmers across the UK.

### How did the project address this?

The project used data sets on RLS and weather conditions in Scotland over a number of years to attempt to establish a mathematical model to calculate risk across seasons. The AHDB winter and spring barley Recommended List trials were used to provide information on disease levels across the UK from 2015 to 2017. In addition weather data were supplied the AHDB meteorological station network across the UK and the relationship between disease levels and the conditions at the start of stem extension were examined. The fungus is known to be seed borne and move asymptotically in the plant so samples were collected from sites with differing environmental conditions and levels of fungal infection were measured using DNA tests.

### What outputs has the project delivered?

The project has shown that a risk forecast based on a single environmental variable is not reliable over years. The project has highlighted the need for the examination of a combination of factors experienced by the crop over the growing season, in order to produce a risk forecast. Analysis of data for spring barley crops in 2017 showed a significant increase in RLS levels at sites with higher temperatures and

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more wetness in the crop. The project has also highlighted the strong influence of the environment on RLS development in crops and potential issues in deriving reliable resistance ratings from such a diverse set of trials. The project has helped provide updated information on the spread of disease symptoms across the UK and raised the importance of correct identification in crops by farmers and researchers. Further work is required to establish the effect of weather on fungal movement in the crop.

### Who will benefit from this project and why?

Farmers will have gained a better appreciation of the appearance of symptoms in their area and some insight into conditions which might favour the disease. This will give them some potential guidance in deciding on fungicide inputs into their barley crops. However, this will only be limited guidance. Researchers have gained a large dataset which can be exploited further to give more information on the factors which contribute to RLS expression.

### If the challenge has not been specifically met, state why and how this could be overcome

Further analysis is required on data to produce a robust risk model for growers

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| <b>Lead partner</b>        | SRUC  |
| <b>Scientific partners</b> |   |
| <b>Industry partners</b>   | Weather Innovations Consulting  |
| <b>Government sponsor</b>  | This project linked into research being carried out by SRUC for the Scottish Government on the influence of environmental factors on RLS development. |

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