NEWSLETTER September 2017

by fera

Optimising Fungicide Applications: On-Site Spore Detection and Molecular Testing

Real-time disease detection and accurate forecasting can support Integrated Pest Management through targeted fungicide applications.

Fungal diseases like grey mould, downy mildew and powdery mildew can have devastating impacts on grape yields and quality. These diseases pose an important issue for UK growers, who are often relying heavily on chemical inputs, which increases production costs, drives the development of fungicide resistance and can lead to adverse health impacts on vineyard workers.

Fera is currently investigating the potential of airborne spore detection, integrated with on-site molecular testing and modelling for disease forecasting. Combined outputs have the potential to direct initial fungicide applications to when both, spores and conducive weather conditions for infection, are present. This could reduce the total number of sprays needed.

In 2017, we have set up 3 field experiments at Ryedale Vineyards, Brogdale and Plumpton College, to investigate the relationship between detected spore levels, weather conditions and disease.

Common name Grey mould
Scientific name *Botrytis cinerea*
Main symptoms Fuzzy grey mould

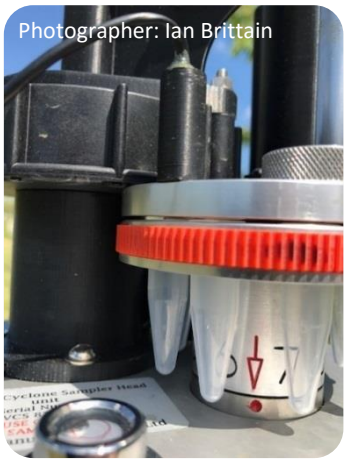
Common name Downy mildew
Scientific name *Plasmopara viticola*
Main symptoms Yellow leaf spots, white mould

Common name Powdery mildew
Scientific name *Erysiphe necator*
Main symptoms Powdery white mould

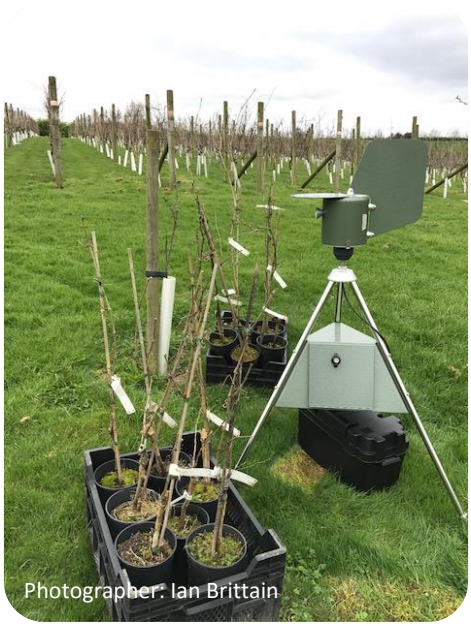
<u>Upcoming Events</u>: On-site demonstrations of spore detection and molecular testing methodologies (see page 3)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 652615.

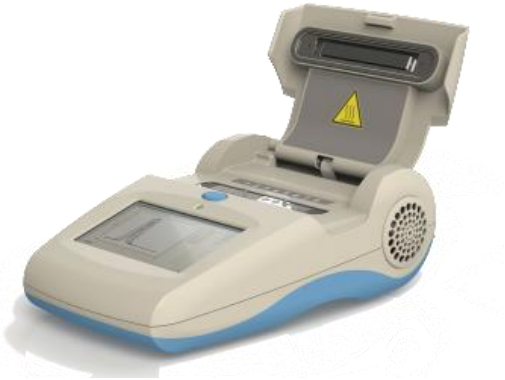
Field experiments 2017


Photographer: Ian Brittain

A single spore trap is located within each experimental vineyard to sample airborne spores on a daily basis. Every 7 days the local operators send the sample tubes to the Fera laboratory, where DNA tests are performed to determine daily spore numbers for the three target species: grey mould, downy mildew and powdery mildew. Meteorological data, including temperature, rainfall, and windspeed, is then being acquired from local meteorological stations to identify the periods when the weather was suitable for spores to infect the vines. This will contribute to the development of infection models that can predict disease risk and therefore when best to apply a fungicide treatment.


Photographer: Ian Brittain

Spore traps are widely used in plant pathology for monitoring the spread of airborne diseases. They draw in several litres of air per minute and any airborne particles sucked in are deposited in a plastic tube. DNA testing enables scientists to determine the exact species and approximate number of spores sampled.



Currently tests are being done in the laboratory, but Fera is working with its partner OptiGene to deliver this testing in the vineyard using the Genie instrument. This 'in-field' testing enables results to be generated within 30 minutes of collecting a sample, providing greater precision in the timing of spray applications.

http://www.optigene.co.uk/instruments/instrument-genie-iii/

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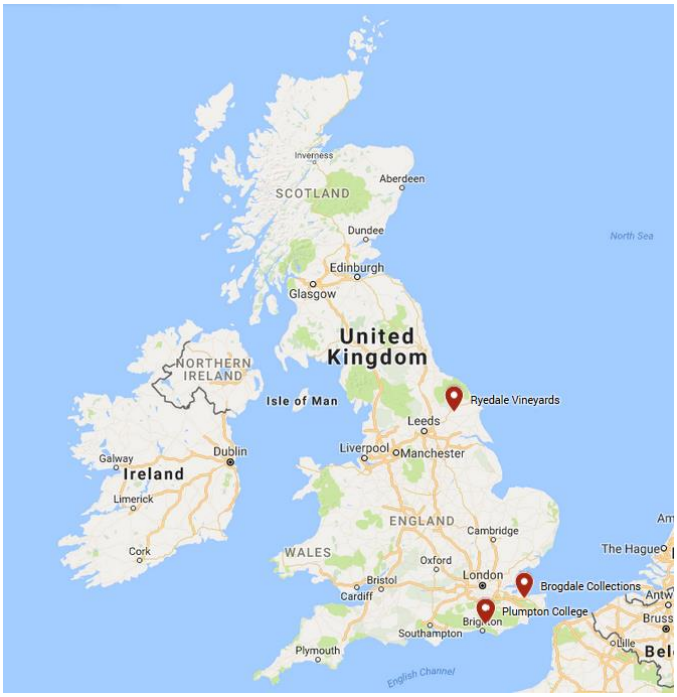
Locations of field experiments



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RYEDALE VINEYARDS

EST. 2006

BROGDALE COLLECTIONS

The Home of the National Fruit Collection

Plumpton College

At Plumpton College, Fera's work is supported by MSc Viticulture and Oenology student, Irene Harte, who focusses on analysing the relationship between airborne inoculum levels and disease expression for downy mildew.

Demonstration workshop February 2018


Plumpton College

We are currently in the process of planning a demonstration workshop at Plumpton College, Lewes. At this event our detection equipment, including spore traps and mobile diagnostic units, will be available to enable participants to get hands on with testing. There will be ample opportunities for you to ask questions and provide feedback on the work.

Further information will be sent out shortly. Should you have any questions in the meantime, please do not hesitate to contact us: Barbara.Agstner@fera.co.uk

Mobile diagnostic unit

VitiSmart is a three year interdisciplinary research project aiming to produce a resilient viticultural system able to speedily recover from biotic and abiotic stresses, by combining resilient cultivars with beneficial microorganisms to acquire a natural-cross-tolerance while maintaining yields.

Visit our website: http://www.univ-reims.fr/site/vitismart/home,19580,33109.html?

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