Prediction of Sclerotinia Spore Release in Oilseed Rape Fields in the United Kingdom

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Technology Strategy Board
Driving Innovation

Sensors for protecting crop YIELD

Why is Crop Disease a problem

- Global population expected to reach 9,000,000,000 people in 2050
- Global food supply must increase by the same amount to prevent widespread food crisis
- Increasing the supply of arable land to farm is likely to be a very difficult option

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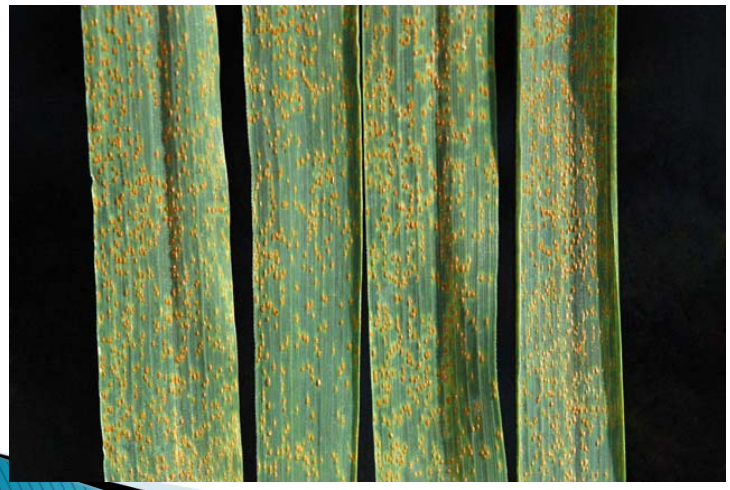
Why is Crop Disease a problem



- Increasing efficiency of existing arable land is thus the likely solution
- Currently approximately 16% of global potential crop production lost to diseases
- Eliminating or radically reducing crop yield lost to diseases must be a top priority

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Sclerotinia in Oilseed Rape

- Currently Oilseed Rape is a highly valuable product in the UK (€500+ per tonne)
- Current typical yields on working UK farms are approx 3.7 tonnes per hectare
- Agricultural research stations have managed to increase this to 7 tonnes per hectare

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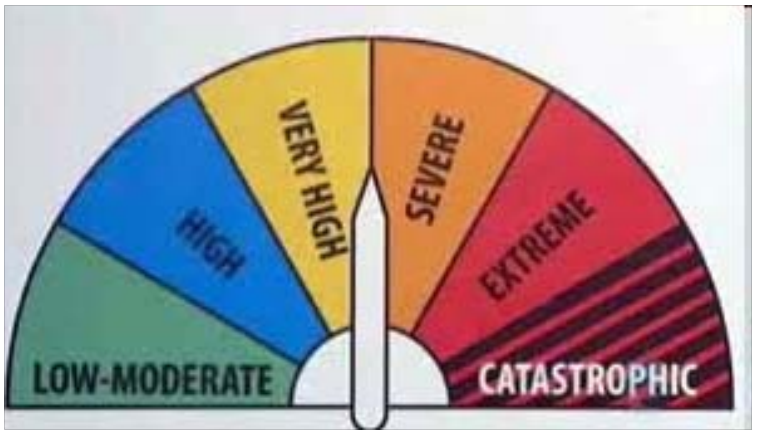
Sclerotinia in Oilseed Rape



- Considerable scope for boosting crop yields
- Crop lost to Sclerotinia has been identified as a likely candidate for boosting yield
- Presence of spores is directly related to lost crops
- An early warning system that can anticipate the onset of sclerotinia infections will allow growers to protect their crop yield with a chemical spray

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The SYield Project

- Currently a research project is in progress to design such an early warning system
- Experimental work has been performed in 2011 at the Rothamsted Research facility north of London, England
- An Oilseed Rape field was deliberately inoculated with spore fruiting bodies

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The SYield Project

- Experimental Data retrieved consists of measurements of spore DNA in the canopy air as well weather data
- Additional experimental work has just been completed at Rothamsted Research, Syngenta and Velcourt sites
- A third series of experiments in 2013

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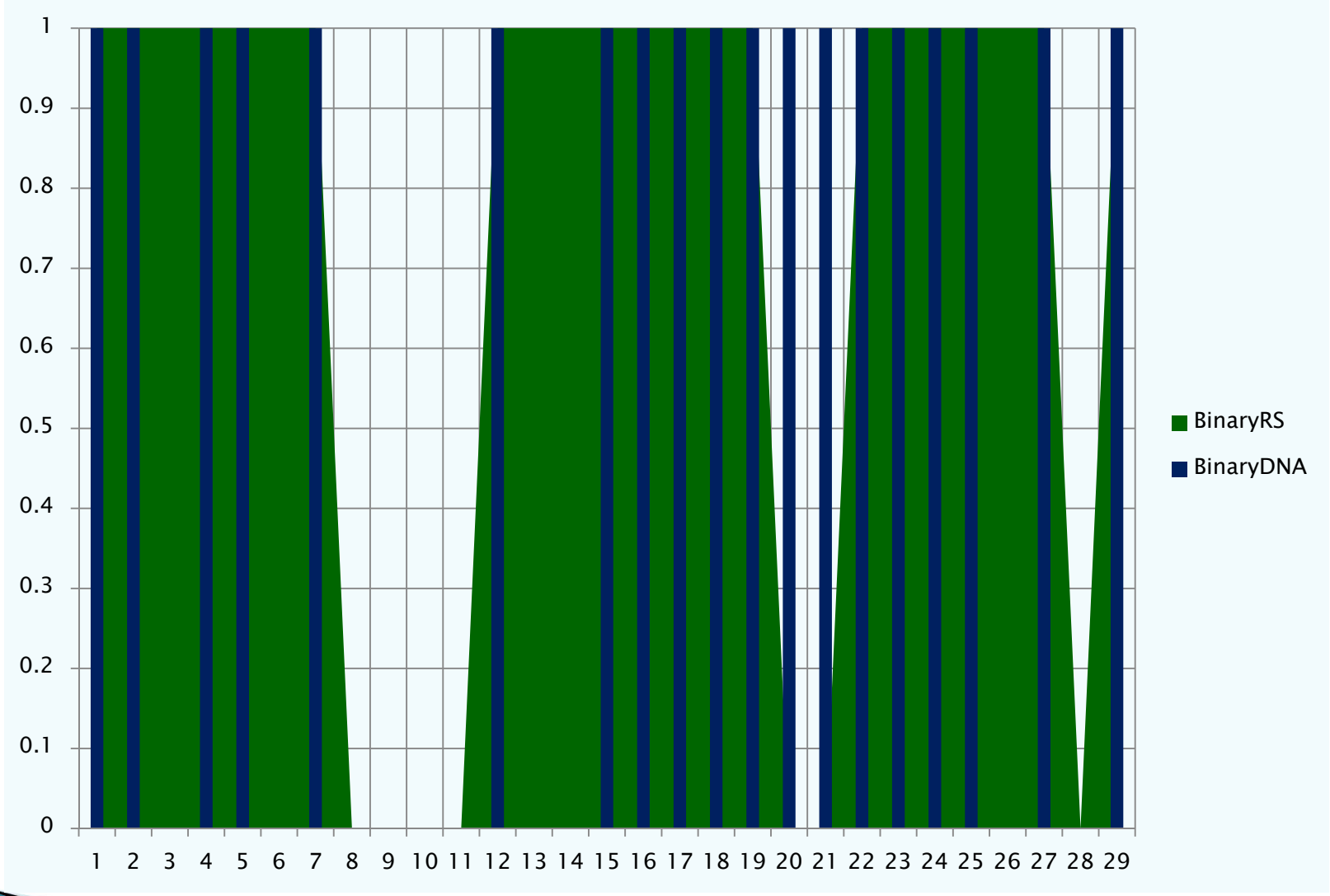
The Raiso-Sclero Model

- A predictive model of Sclerotinia in French Oilseed rape was developed by Syngenta
- This model simulates soil climate conditions, apothecia life cycle and crop flowering development
- This model was applied to the datasets from Rothamsted Research to see if Sclerotinia in British Oilseed Rape fields can be modelled in the same way
- The results of applying the model showed that the major releases of spores could be regularly predicted
- Additional experimental data will be required to build quantitative predictive model of spore level

Raiso-Sclero Results



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Conclusions and Future work

- The French Raiso-Sclero model was initially setup in conjunction with the CETIOM research institute with petal kit data and was successful in predicting Sclerotinia in French OSR and Beans
- Raiso-Sclero qualitatively successful in identifying periods of high spore release at Rothamsted
- The Raiso-Sclero model can be modified to better reflect the differing UK environmental conditions
- The experimental data from this years and next years field trials can be used to re-evaluate the ability of the model to predict spore levels
- Additional experimental data on crop damage will allow predictive models of lost yield to be developed

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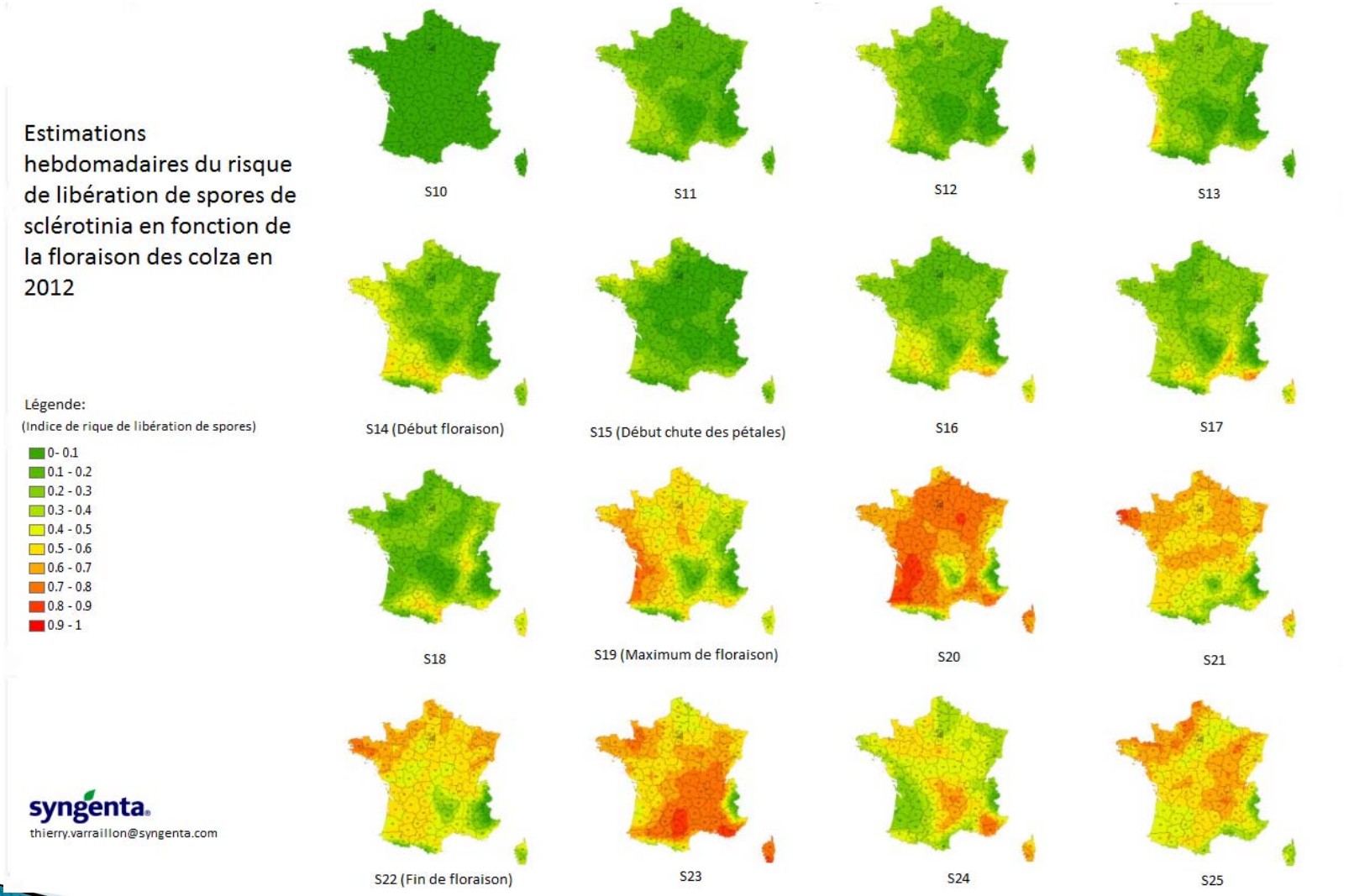
Conclusions and Future Work

Estimations hebdomadaires du risque de libération de spores de sclérotinia en fonction de la floraison des colza en 2012



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