

Genetic basis of partial resistance against *Pyrenopeziza brassicae* in oilseed rape



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Introduction

- ❖ Light leaf spot (LLS), caused by the pathogen *Pyrenopeziza brassicae*, is the most damaging disease of oilseed rape in the UK.
- ❖ LLS accounts for up to £160M annual yield loss despite expenditure of £20M on fungicides.
- ❖ This disease is controlled by fungicide applications and partially resistant cultivars (AHDB recommendation lists).
- ❖ *P. brassicae* has developed fungicide insensitivity.
- ❖ Better understanding of quantitative resistance (QR) against *P. brassicae* in oilseed rape is important in designing improved and durable control strategy against LLS.

Aim

- ❖ To study genes involved in QR in oilseed rape against *P. brassicae*.
- ❖ To understand the contribution of host wax/cuticle to this pathosystem.

Objectives

- ❖ To screen *B. napus* accessions and *B. rapa* wax mutants under glasshouse conditions.
- ❖ To assess cuticle permeability of *B. rapa* wax mutants using toluidine blue staining.

Materials and Methods

- ❖ 195 *B. napus* cultivars were spray inoculated with a *P. brassicae* spore suspension. Disease were scored on a scale of 1-6 (Fig.1).
- ❖ Associative transcriptomics was used to identify 8 genes that were differently expressed in partially resistant and susceptible accessions.
- ❖ Scanning electron microscopy was done to track pathogen and decide future gene expression works.
- ❖ Toluidine blue staining were done before and after inoculation with pathogen on *B. rapa* wax mutants.

Results

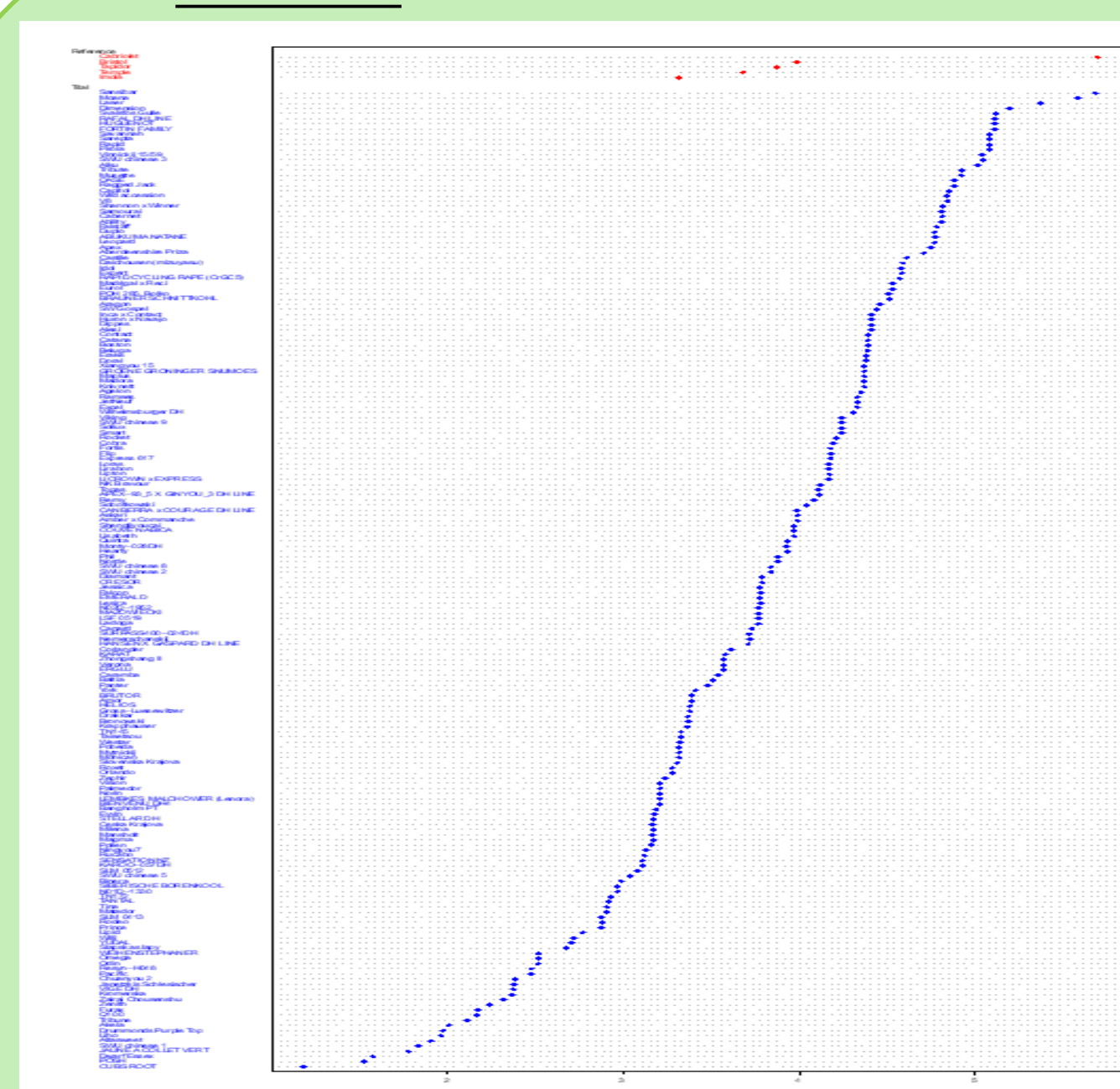


Figure 1: LLS disease scoring of 195 *B. napus* accessions

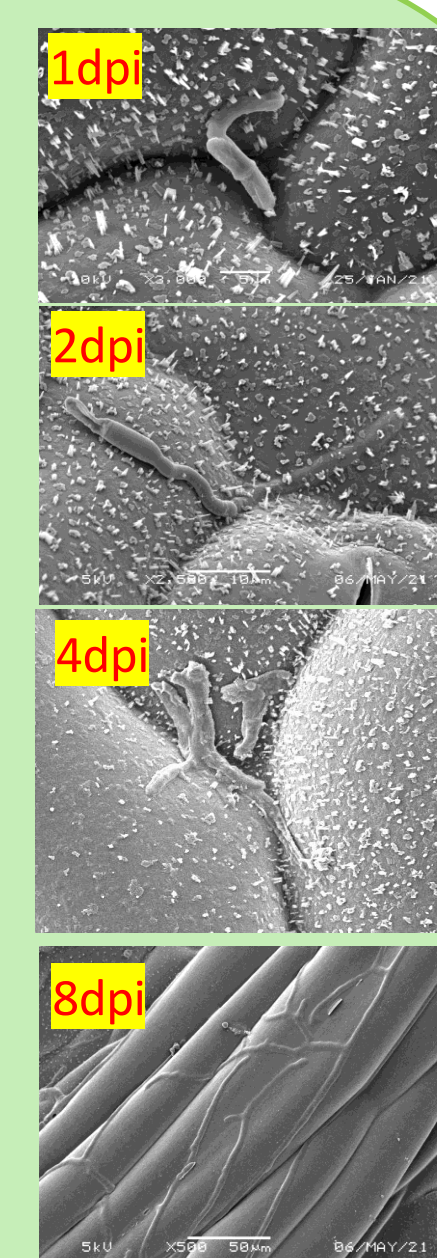


Figure 2: SEM results on susceptible *B. napus* cabriolet



Figure 3: Toluidine blue staining with wild type R-O-18, two glaucous (GL) and non-glaucous (NG) mutants of *B. rapa* from top left to bottom

Discussion

- ❖ The four most susceptible (Dwarf Essex, Laser, Sansibar and Cabriolet) and resistant (POSH, SWU Chinese1, Cubs Root and Moana) cultivars were chosen from glasshouse results for further experiments.
- ❖ R-O-18 and NG (more wax) showed more permeability and susceptibility.
- ❖ GL (less wax) was less permeable and more resistant.

Works in progress

- ❖ Gene expression using multiplex Taqman qPCR to study the expression of GEMs during the interaction with *P. brassicae*.
- ❖ KASP primer analysis of *B. rapa* TILLING mutants to confirm the involvement of GEMs in partial resistance against *P. brassicae*.
- ❖ Quantification of pathogen DNA.
- ❖ Analysis of wax and cutin quantities and compositions in pathogen challenged *B. napus* leaves with differences in susceptibility to *P. brassicae* and in *B. rapa* wax mutants.