



Effector-triggered defence of brassicas against extracellular fungal pathogens

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Oilseed rape diseases

Extracellular



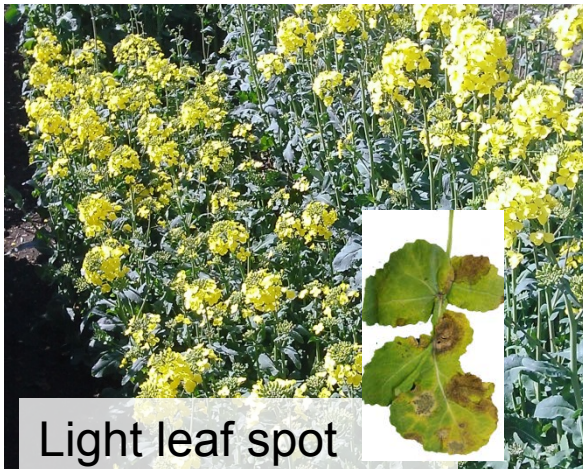
Phoma stem canker
Leptosphaeria maculans



Clubroot
Plasmodiophora brassicae



Stem rot
Sclerotinia sclerotiorum



Light leaf spot
Pyrenopeziza brassicae

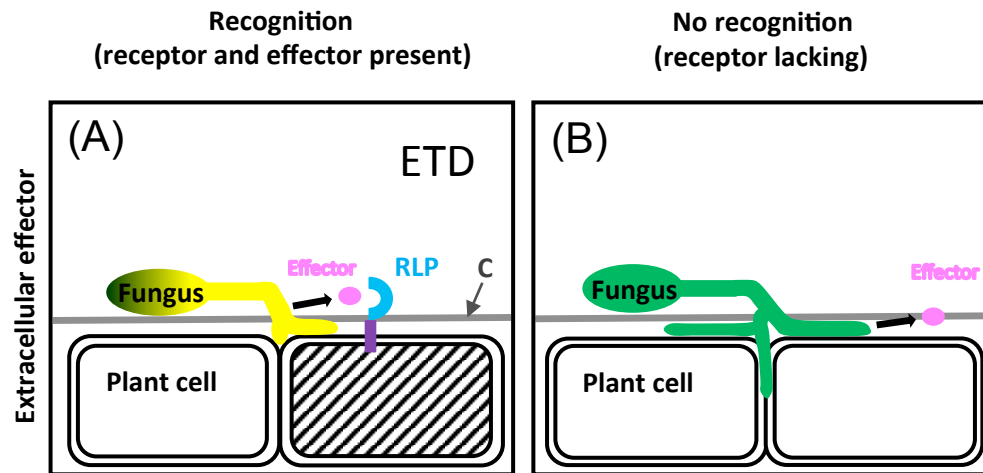


Verticillium
Verticillium longisporum



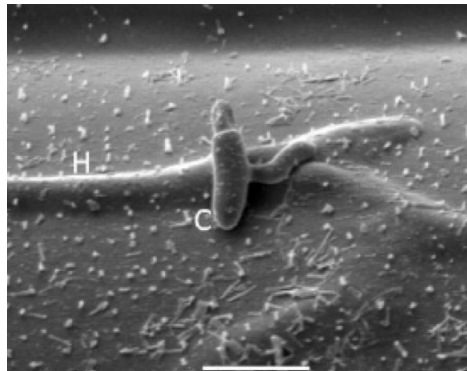
Black spot
Alternaria brassicae

Effector-triggered defence (ETD) against extracellular fungal pathogens



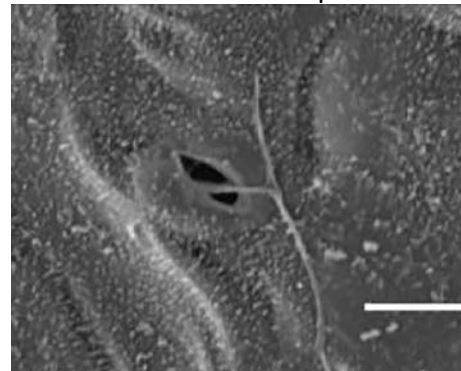
- Apoplastic pathogen effectors
- Effector recognition by receptor proteins (RLPs) that interact with SOBIR1
- Delayed resistance response may include host cell death
- ETD slows pathogen colonisation and does not eliminate the pathogen

P. brassicae – subcuticular niche



E. Boys (2009) unpublished

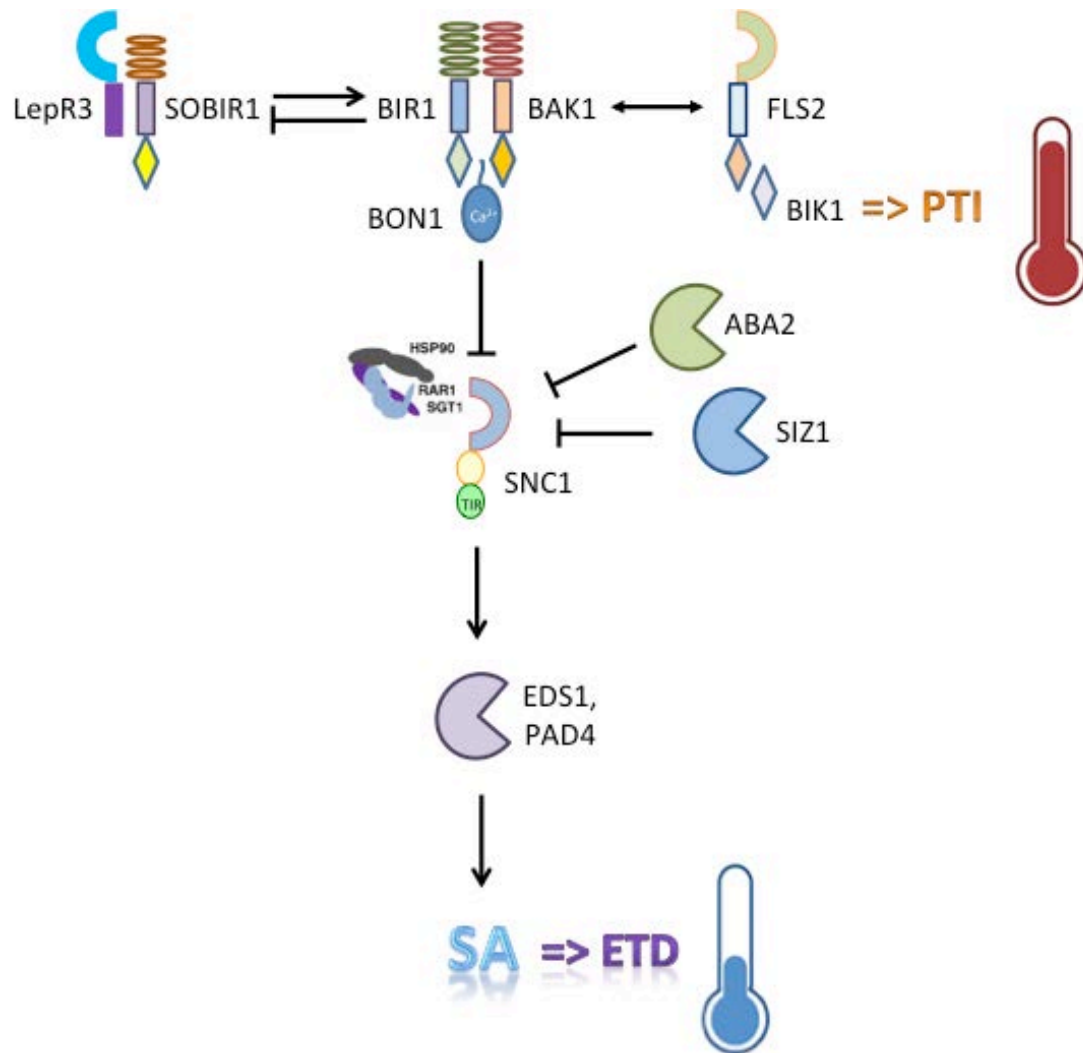
L. maculans – stomatal penetration



Huang et al. (2003) Plant Pathol

Stotz et al. (2014) Trends Plant Sci
[youtube.com/watch?v=Y9RoGrsZGCY](https://www.youtube.com/watch?v=Y9RoGrsZGCY)

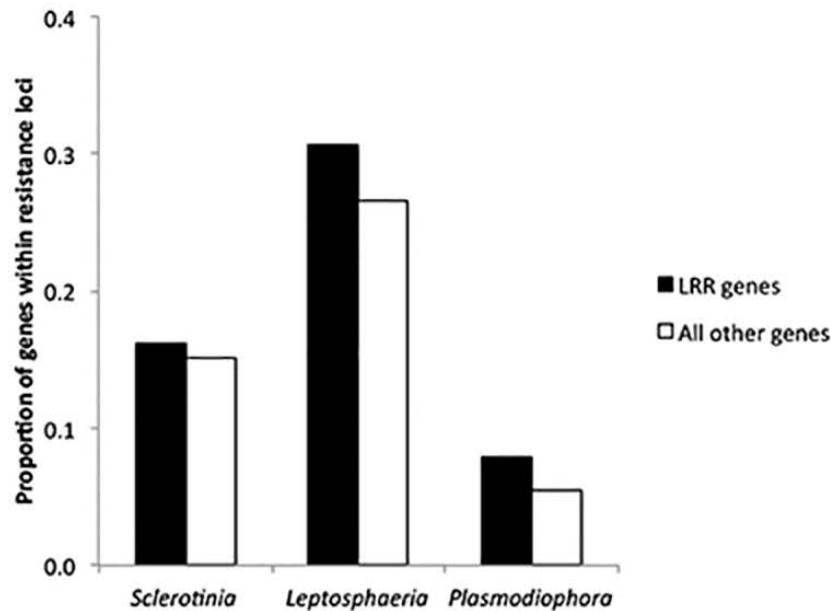
Resistance against extracellular fungal pathogens



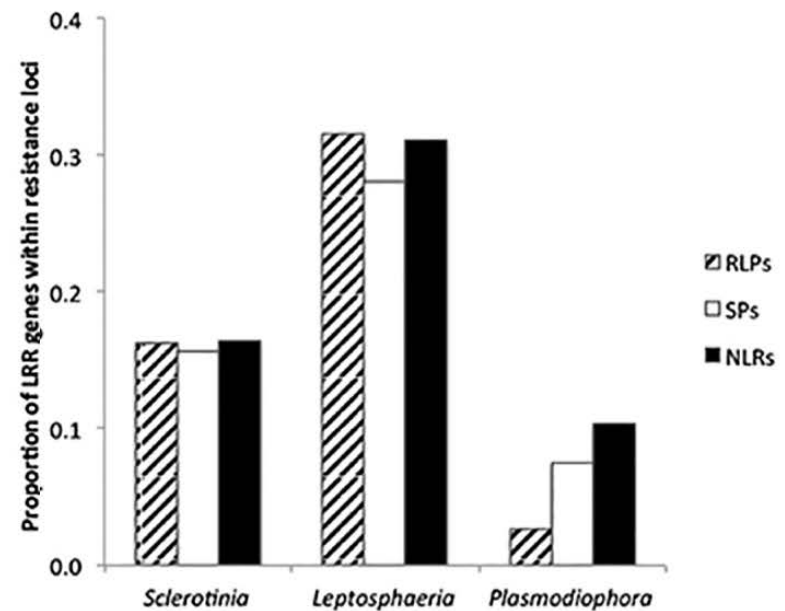
- Major resistance gene against *P. brassicae*
- Temperature sensitivity of *R* gene-mediated resistance
- Interactions between pathogen effectors and their corresponding host receptors

Over-representation of NLR genes in resistance against clubroot pathogen

A



B



Number of LRR genes in mapped regions:

Sclerotinia: 118

Leptosphaeria: 221

Plasmodiophora: 57

Total in genome: 720

Proportion of LRR genes belonging to specific family within resistance loci

Fine mapping of a major resistance locus against *P. brassicae* and identification of candidate resistance genes



Poster 207

Chinthani Karandeni Dewage

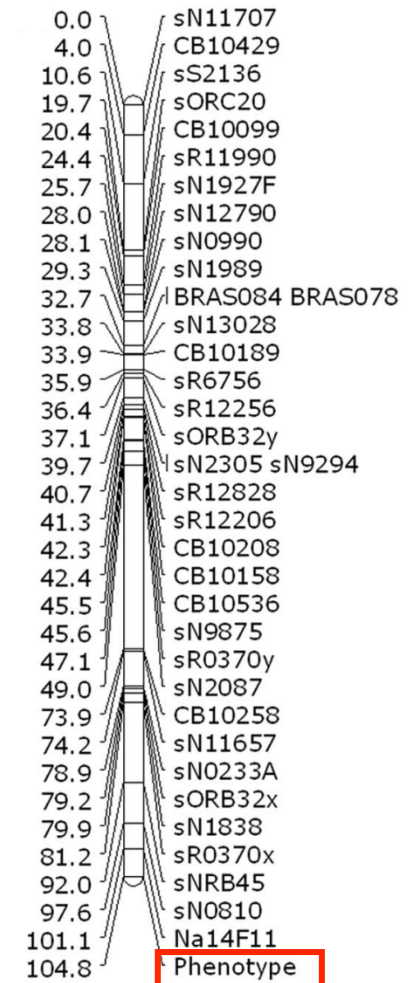


Resistant phenotype



Susceptible phenotype

B. Napus
chrA01



Fine mapping of a major resistance locus against *P. brassicae* and identification of candidate resistance genes

Fine mapping of the resistance locus using KASP markers

Fine mapping of a major resistance locus against *P. brassicae* and identification of candidate resistance genes

(c) Identification of candidate genes for resistance against *P. brassicae*

Temperature sensitivity of resistance against *Leptosphaeria maculans*

1. Temperature sensitivity of *R* gene-mediated resistance
2. Role of *SNC1*
3. Temperature sensitivity of QDR (with NPZ)

Poster 360



Katherine Noel

Effect of temperature on *R* gene-mediated resistance

Cotyledon assay in CE cabinet – challenge Topas NILs (Larkan et al., 2016) with avirulent *L. maculans* isolates at 20°C and 25°C.

- Assess lesion development
- Lines that display more severe symptoms at 25°C than at 20°C judged are temperature-sensitive.

Differences in
temperature
sensitivity of *R* gene-
mediated resistance
in *NILs* challenged
with *L. maculans*
isolates expressing
AvrLm4-7

-> Gene expression

Differences in temperature sensitivity of different *R* genes

Duplicated genes in the brassicas corresponding to *AtSNC1*

Keiichi Okazaki



Poster 360

Hypotheses:

- *FocBr1* confers resistance to *Fusarium oxysporum*.



Predicted interactions between ATR1 and RPP1

- Interaction model with RPP1-WsB
- Analysis of positively selected amino acids (PAML)
- Functional analysis in *Nicotiana benthamiana*



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