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Differences in interactions of *Brassica napus* with two *Leptosphaeria* species

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Compatible interactions between *Brassica napus* and *Leptosphaeria* species



Lb: *L. biglobosa*
Lm: *L. maculans*

Fitt et al. (2006) Ann. Rev. Phytopathol.

Weak negative correlation in phoma leaf spotting caused by *Leptosphaeria maculans* and *L. biglobosa* species

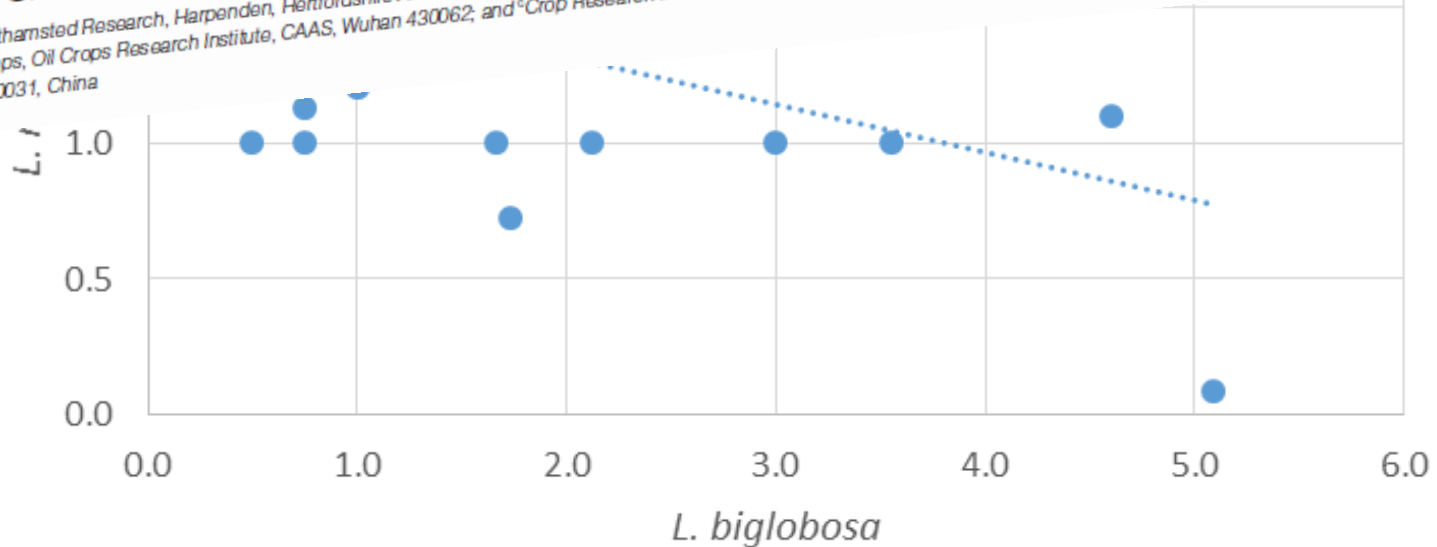
Plant Pathology (2006) 55, 401–412

Doi: 10.1111/j.1365-3059.2006.01354.x

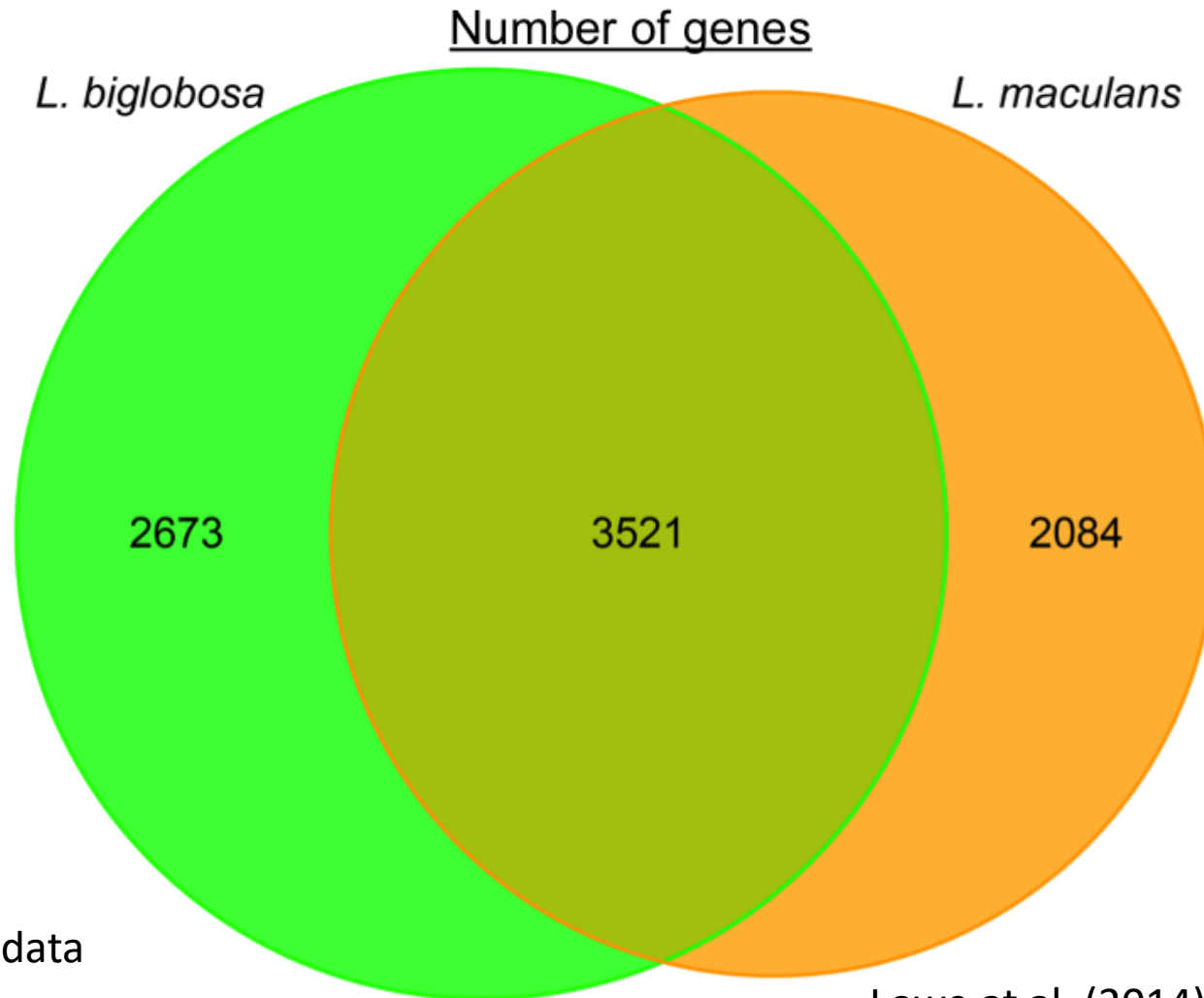
Resistance to *Leptosphaeria maculans* (phoma stem canker) in *Brassica napus* (oilseed rape) induced by *L. biglobosa* and chemical defence activators in field and controlled environments

S. Y. Liu^{ab}, Z. Liu^{ac}, B. D. L. Fitt^{a*}, N. Evans^a, S. J. Foster^{a†}, Y. J. Huang^a, A. O. Latunde-Dada^a and J. A. Lucas^a

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Species-specific response in host gene expression



RNAseq data
7 dpi

Lowe et al. (2014) PLoS ONE

Pathogen species-specific host gene expression

L. maculans

- **Protein turnover** (6 GO-terms, including proteasome, ubiquitin and unfolded proteins, endopeptidase)
- **Vesicle trafficking** (12 GO-terms, guanylate chemistry, clathrin coat, COPII, exocytosis, vesicle transport, signal peptide)
- Carbohydrate biosynthesis (2 GO-terms, oligosaccharide biosynthesis)

Common

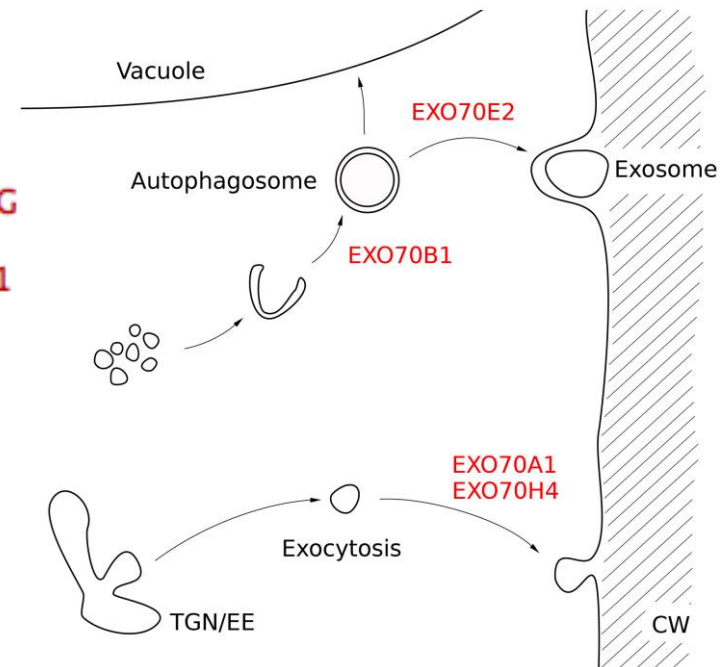
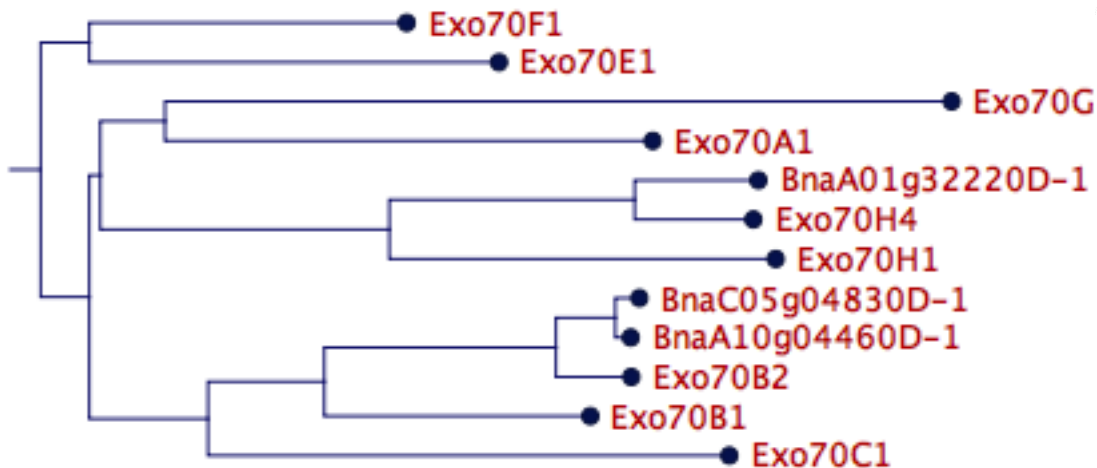
- Protein phosphorylation (2 GO-terms, Ser/Thr kinase)
- Chitinase/chitin binding (3 GO-terms, chitin catabolism)
- Calcium (3 GO-terms, binding, transport)
- Proline catabolism (2 GO-terms, proline dehydrogenase)
- Phospholipid transport (2 GO-terms)

L. biglobosa

- Carbohydrate metabolism (4 GO-terms, hexose metabolism, trehalose biosynthesis)
- **Amino acid biosynthesis** (3 GO-terms, aromatic amino acid metabolism)
- **Iron binding** (1 GO-term)
- Dephosphorylation (2 GO-terms, Ser/Thr phosphatase)
- ER (1 GO-term)

Preliminary phylogenetic comparison of *Exo70* coding sequences

Vukasinovic & Zarski (2016) Front Cell Dev Biol



- *Exo70H4* and *Exo70B2* homologs most strongly induced after *L. maculans* inoculation
- Opportunity to obtain targeted CRISPER/CAS9 knockout of both BnaC05g04830 and BnaA10g04460

Exo70H4 TILLING mutant

- Orthologous gene in *B. rapa*: Bra034072
- TILLING line with stop codon mutation: ji31141, CAA/TAA: p.Gln333*/c.997C>T, heterozygous
- KASP marker analysis for segregation analysis in progeny
- Preparation for backcrossing
- Assumption: Loss-of-function mutation will lead to a secretion defect and interfere with susceptibility to *L. maculans*.





Acknowledgements

- Dr Georgia Mitrousia
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- Katie Noel
- Ajisa Ali



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KWS

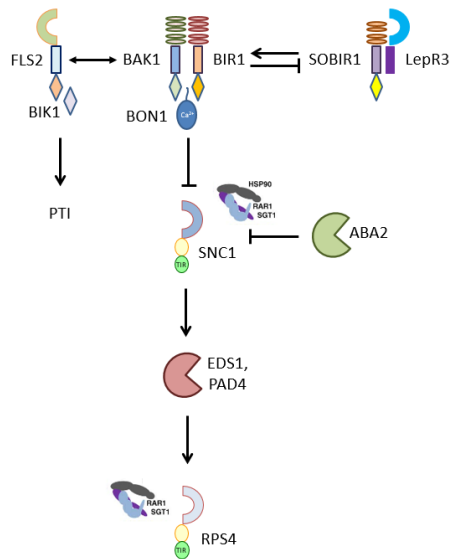


ERA-CAPS



Other projects

- Temperature sensitivity of *R* gene-mediated resistance also against *Fusarium oxysporum*. Collaboration with Prof Keiichi Okazaki at Niigata University and CRISPR-Cas9 knockout of *BoBON1* genes



- Suppression of host immunity by *L. maculans* effectors
- MAQBAT and future projects on resistance against the light leaf spot pathogen *Pyrenopeziza brassicae*

