Investigating *Pyrenopeziza brassicae* pathogen races to combat light leaf spot in winter oilseed rape

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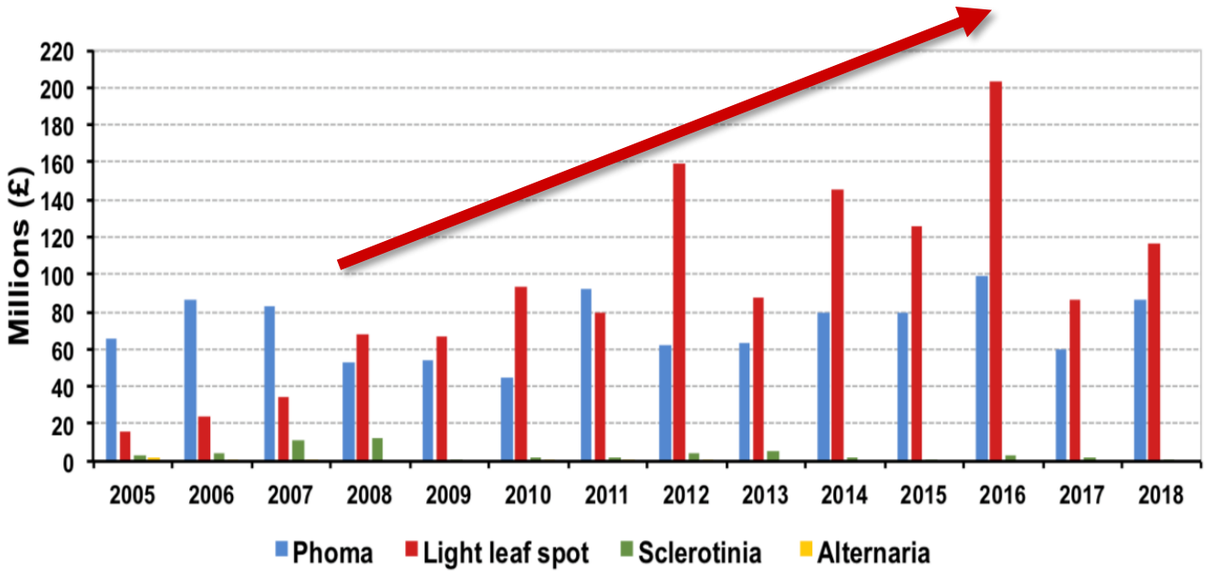
Light leaf spot disease

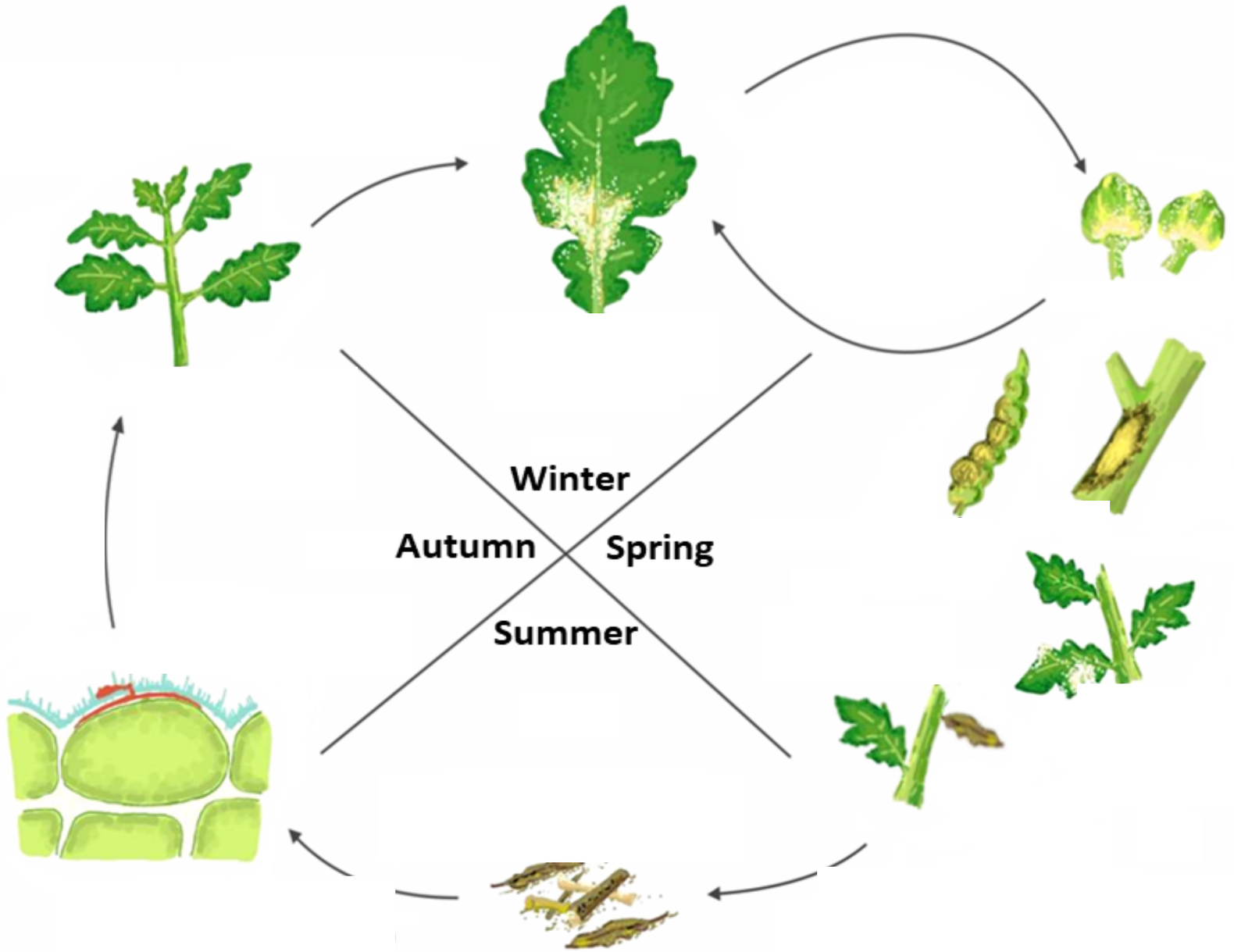
- Fungal pathogen *Pyrenopeziza brassicae* (Pb)
- Previously limited to Scotland, but spread to England
- Most economically damaging disease in OSR in the UK

OSR yield losses caused by diseases in the UK



Data obtained from www.cropmonitor.co.uk

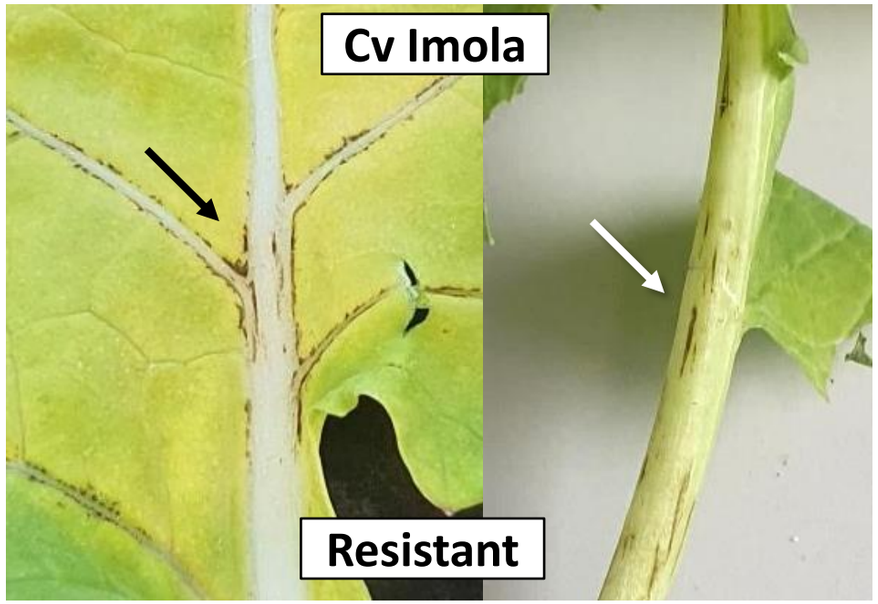
Pathogen life cycle



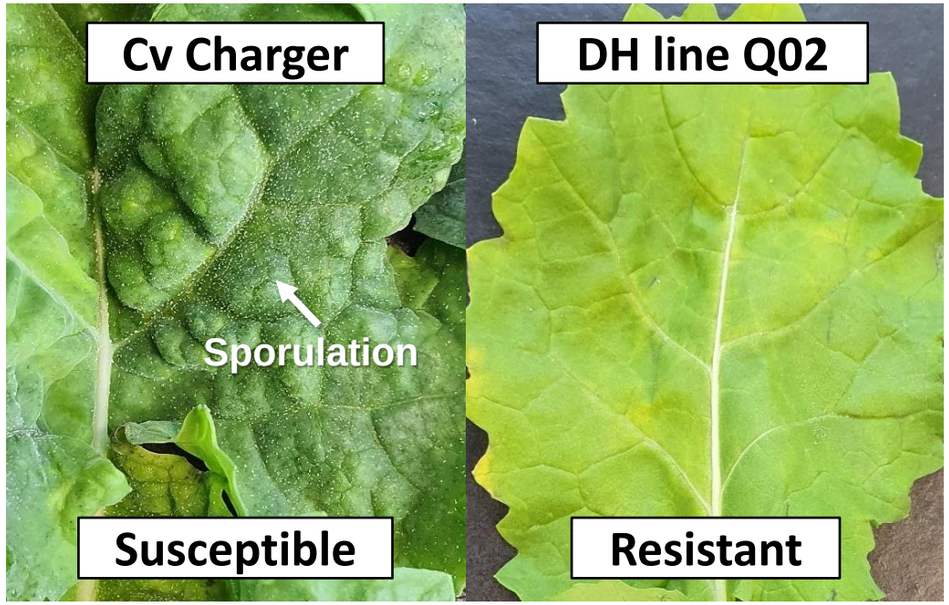
Host resistance against Pb

Two phenotypes of resistance against Pb:

Black flecking



Limited asexual sporulation



Pathogen population studies

Understand regional pathogen populations to deploy cultivars with suitable resistance genes

Phoma stem canker
(well-studied)

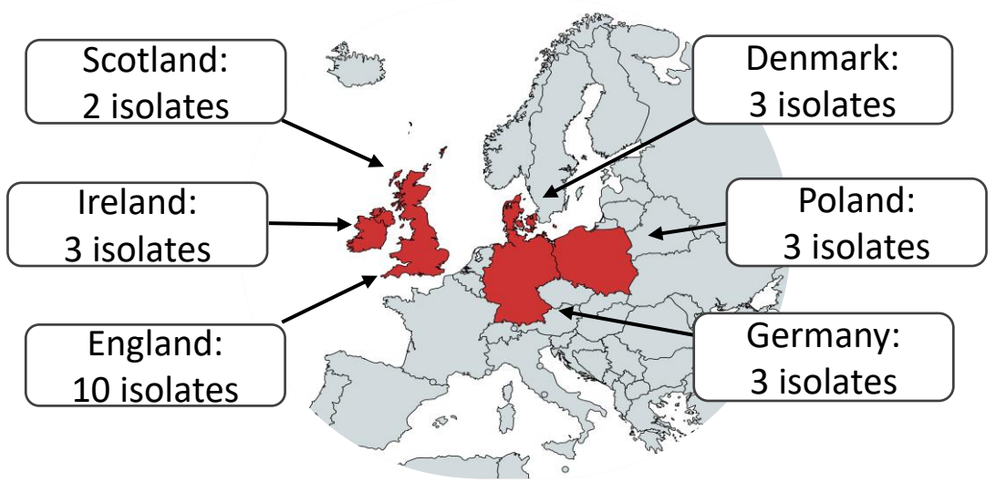
- *Leptosphaeria maculans*
- Studies show major resistance genes breakdown (eg. Sprague *et al*, 2006; Rouxel *et al*, 2003)
- Lm regional races monitoring schemes (eg. CanolaCouncil in Canada)

Light leaf spot
(less understood)

- *Pyrenopeziza brassicae*
- Lack of studies about Pb race structures
- No monitoring schemes or host resistance genes

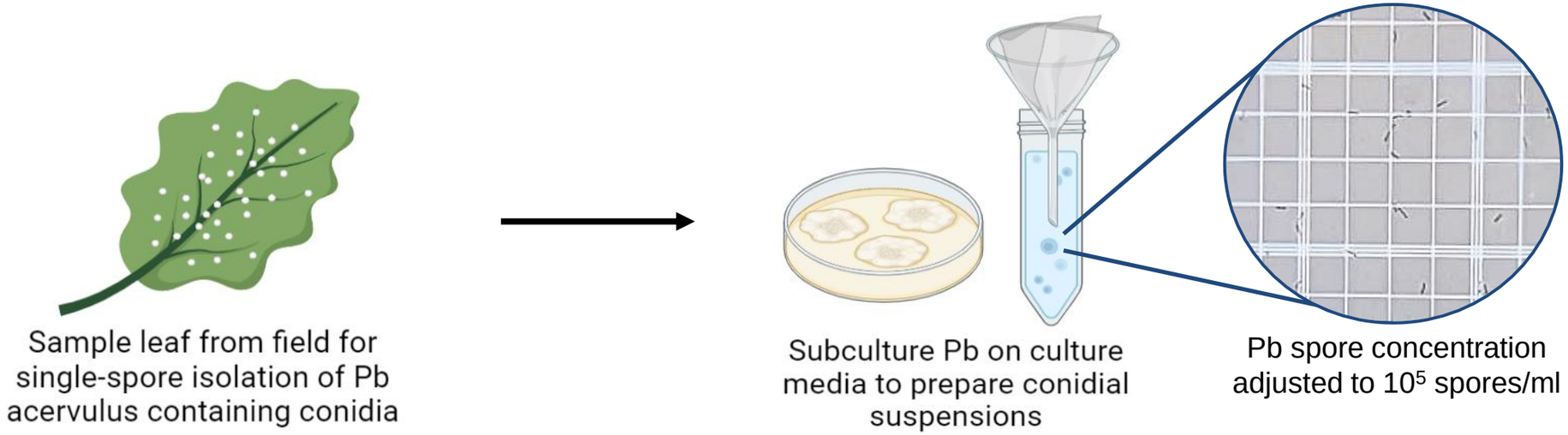
Materials & methods-1: Isolates and cultivars selection

24 Pb field isolates from UK + EU



9 *B. napus* cvs/lines with varying host resistance against Pb

Pb spray inoculum (conidial suspensions) preparation:

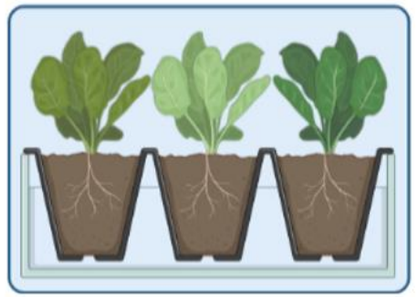


Materials & methods-2: Pathogenicity testing

Glasshouse experiments

Grow differential set of oilseed rape at 20°C light (12hrs)/18°C dark (12hrs) for 4 weeks

Spray inoculate leaves With Pb spore suspensions

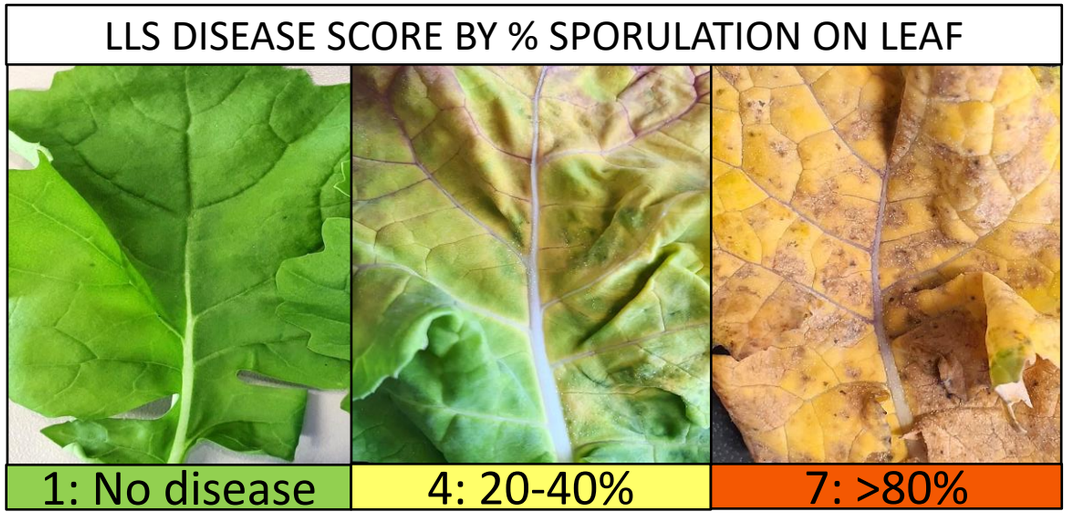


Incubate plants at 16°C light (12hrs)/14°C dark (12hrs) for 23 days for disease development

Harvest plants and incubate in cold + humid environment for 7-9 days

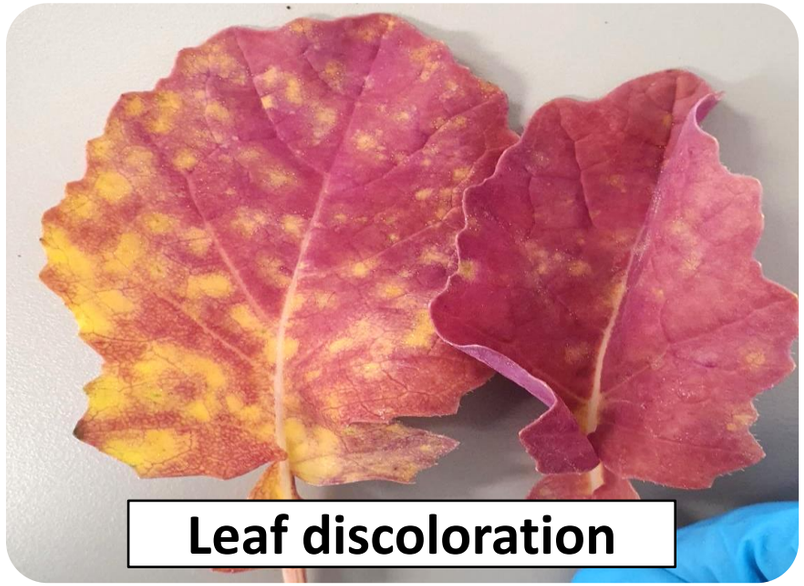
Disease assessment

- Disease score (1-8 scale)
- % sporulation on leaf
- Distorted leaves
- Necrotic flecking



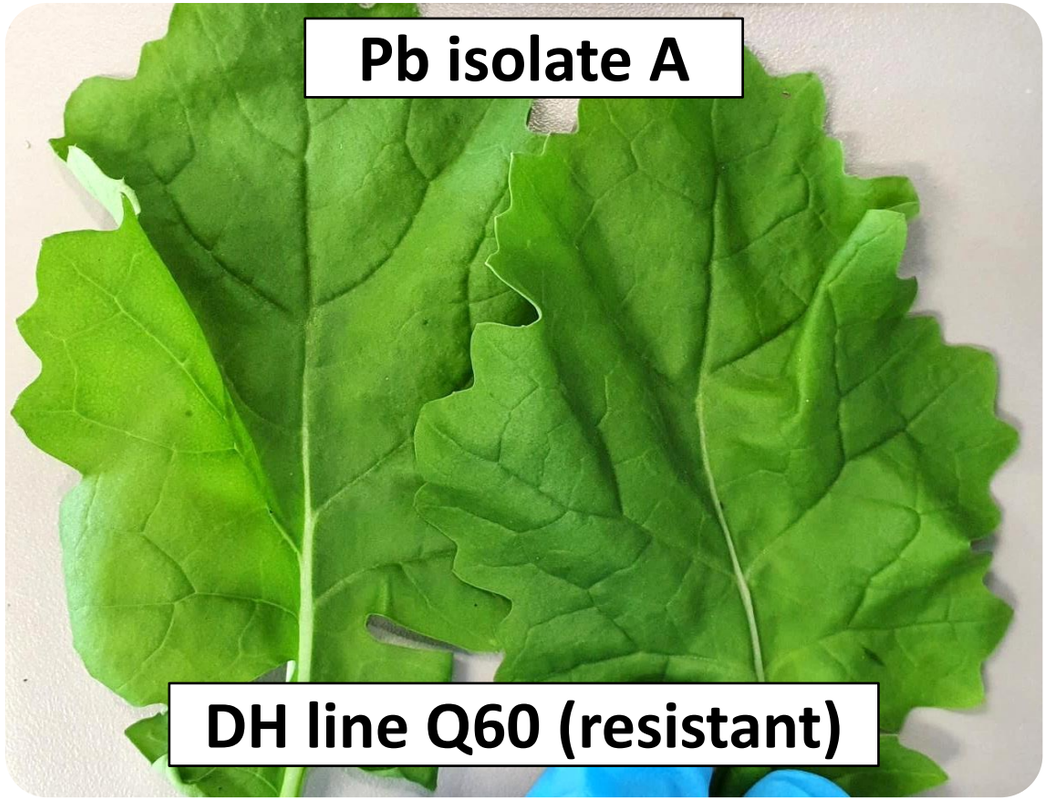
Results-1: LLS phenotype on host plants

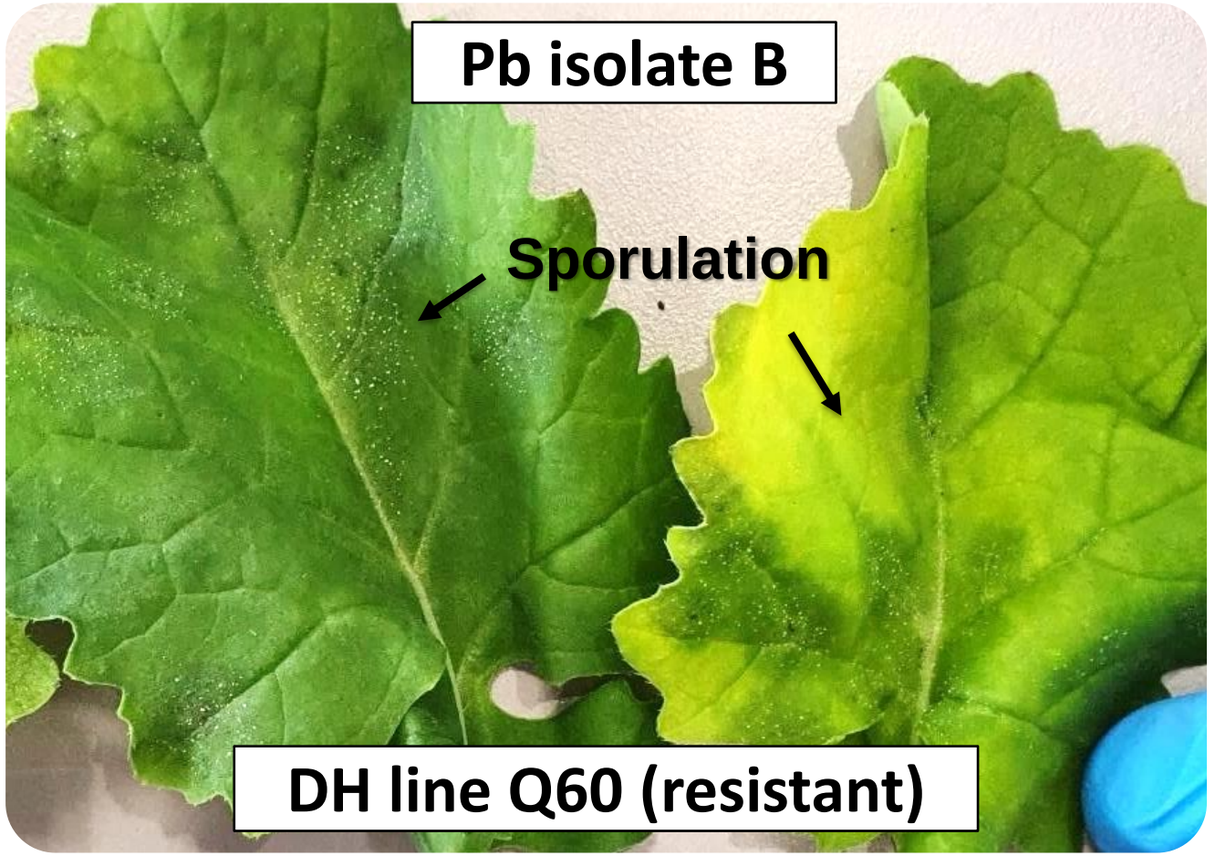
Different symptoms



Results-1: LLS phenotype on host plants

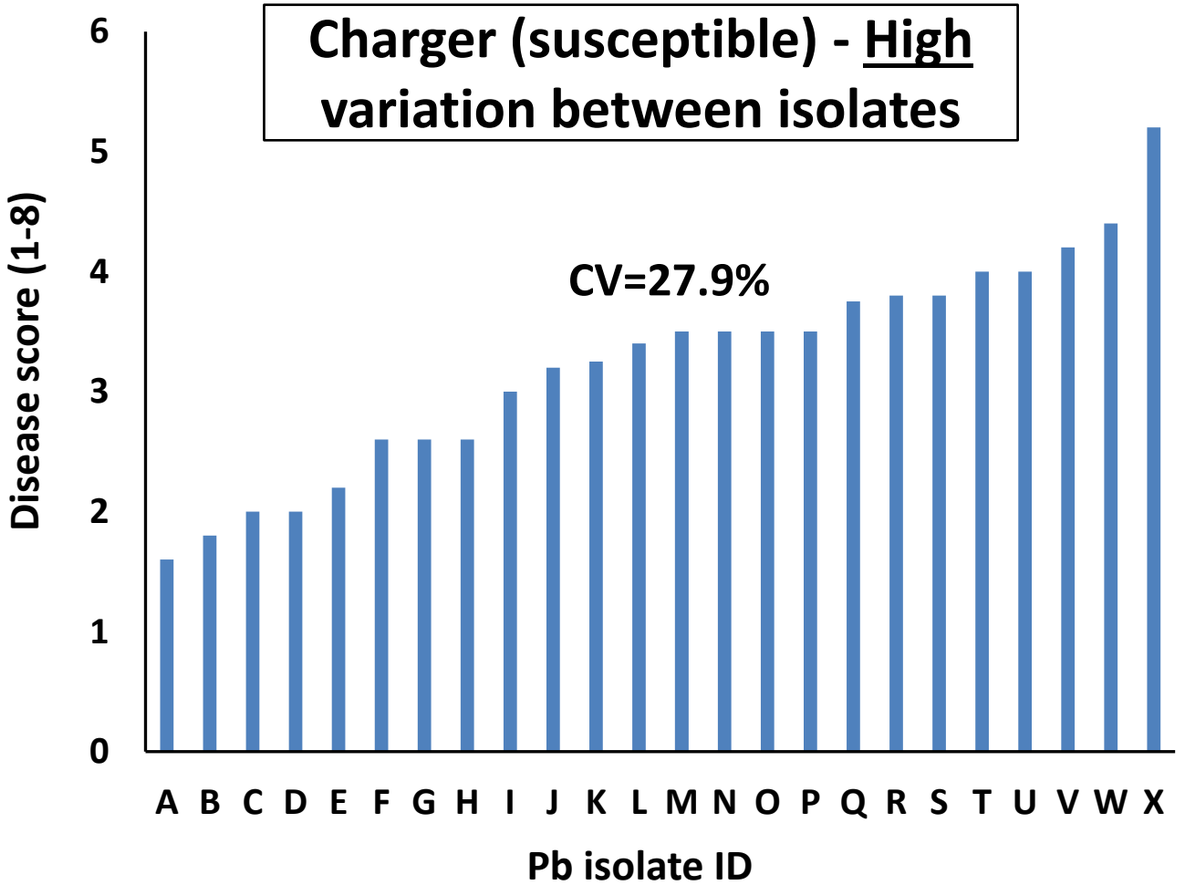
Comparison between different Pb isolates on same cultivar

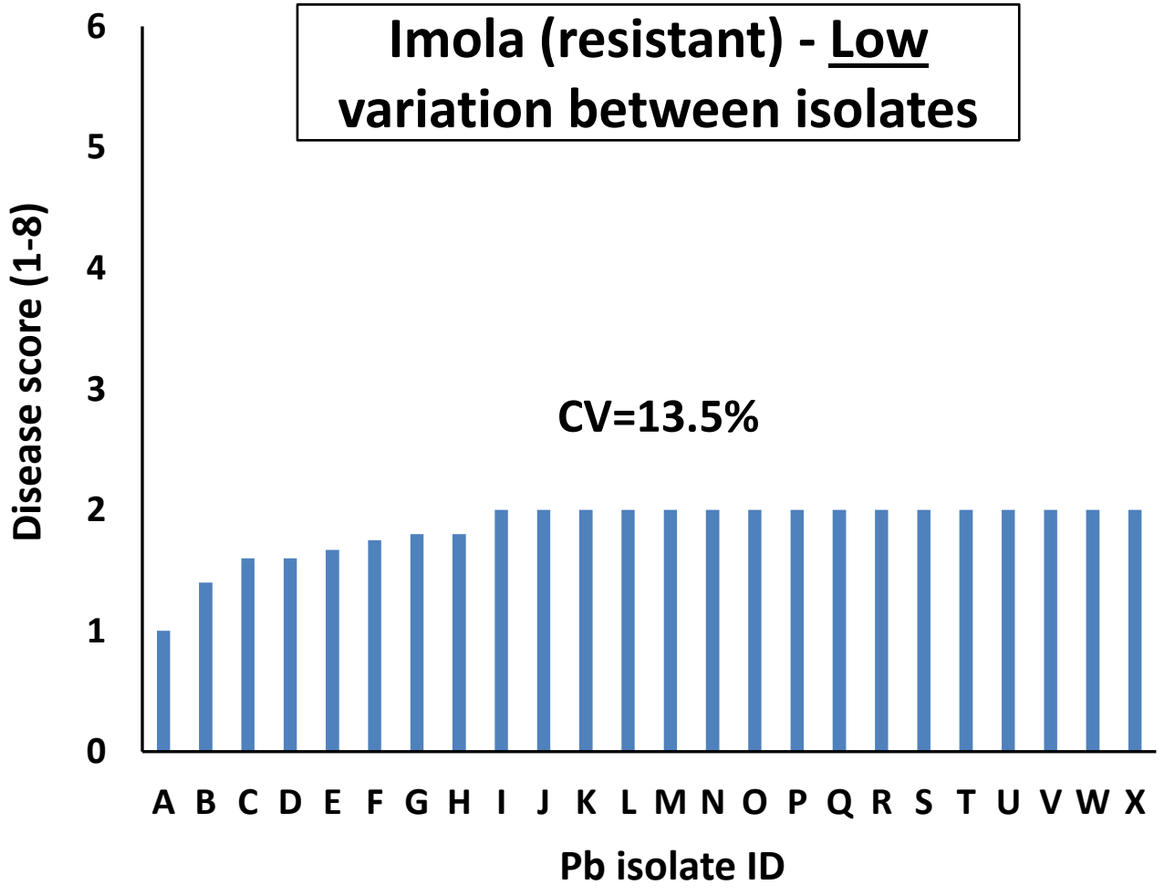




Results-2: Disease assessment and severity

Comparison between different Pb isolates on same cultivar



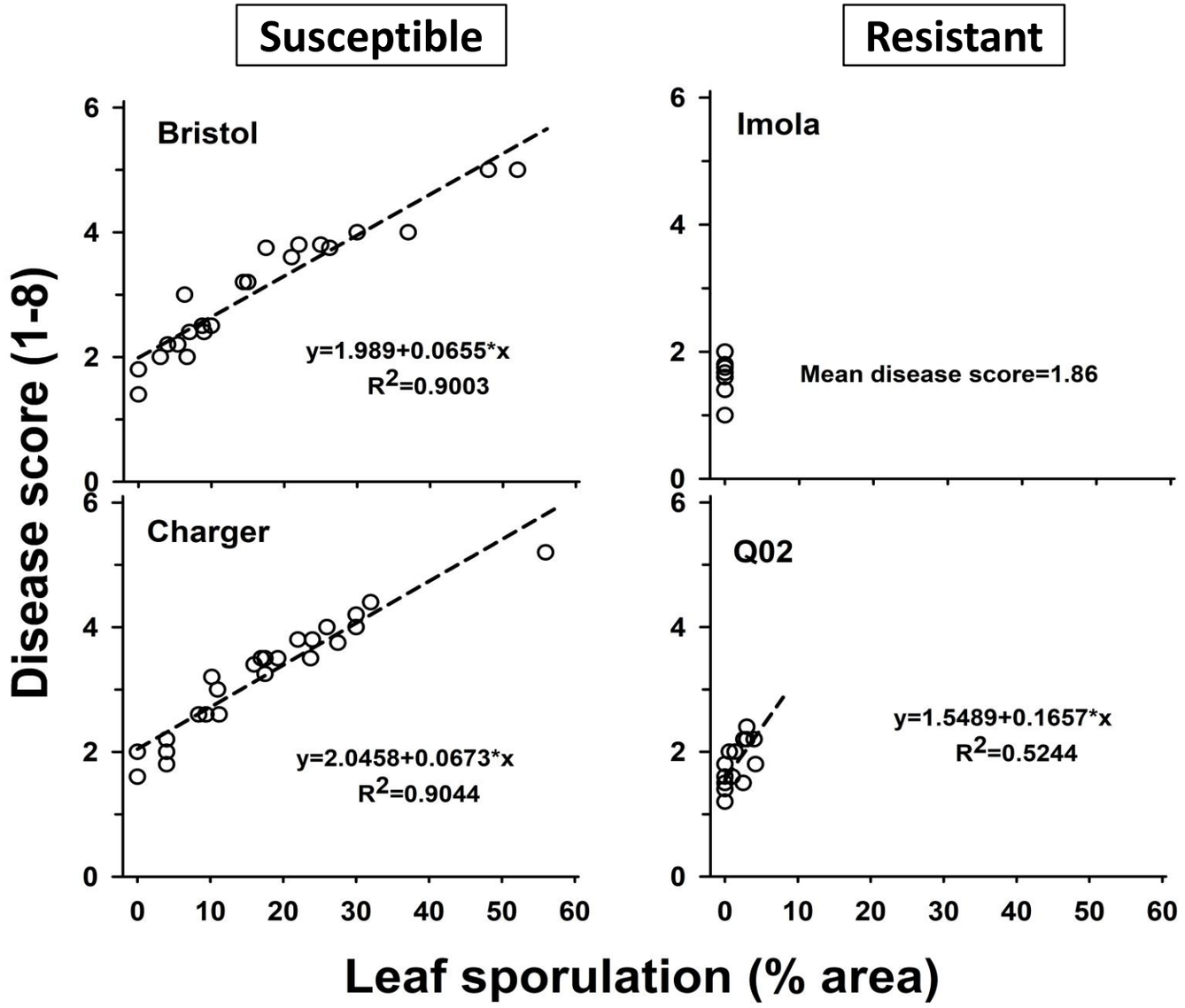


- Difference between isolates and cultivars in disease scores
- Susceptible cvs showed higher variation than resistant ones

Results-2: Disease assessment and severity

Correlations between disease score and leaf area with sporulation

- Susceptible - spread shows variation in disease development between isolates
- Resistant – weaker correlation due to overall lack of disease



Summary

- LLS disease score varied between cultivars/lines
  - ➢ Differences in virulence/aggressiveness between isolates
  - ➢ Needs to monitor pathogen populations for effective use of host resistance
- Disease score and % leaf area with sporulation are good measurements of LLS resistance
- Four cultivars were identified as resistant to the Pb isolates
- Further testing with more Pb isolates to confirm resistance in the four cultivars/lines for breeding

ACKNOWLEDGEMENTS

Thank you for your attention!

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Prof Bruce DL Fitt

Dr Faye Ritchie

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ROTHAMSTED RESEARCH

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