Understanding resistance to *Leptosphaeria maculans* (phoma stem canker) in oilseed rape

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Two types of resistance to *L. maculans*

- **Major gene resistance (complete resistance)**

Resistant **Susceptible**

- **Quantitative resistance (partial resistance)**

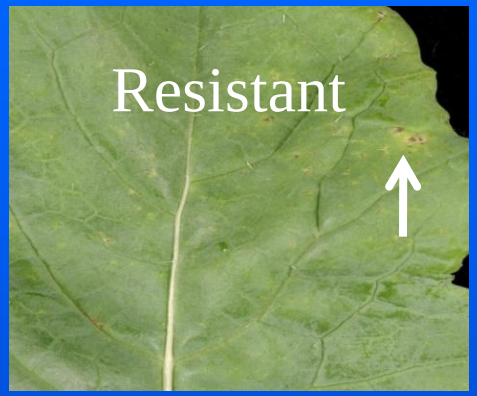
Major gene mediated resistance is not durable

- **Race specific**
- **Effective only if corresponding *Avr* allele is predominant in pathogen population**
- **Information on pathogen races is essential**
- **Many factors (e.g. host cultivar, pathogen fitness cost, temperature) affect race composition of populations**

Temperature affects *Rlm6* resistance to *L. maculans*

15°C

25°C



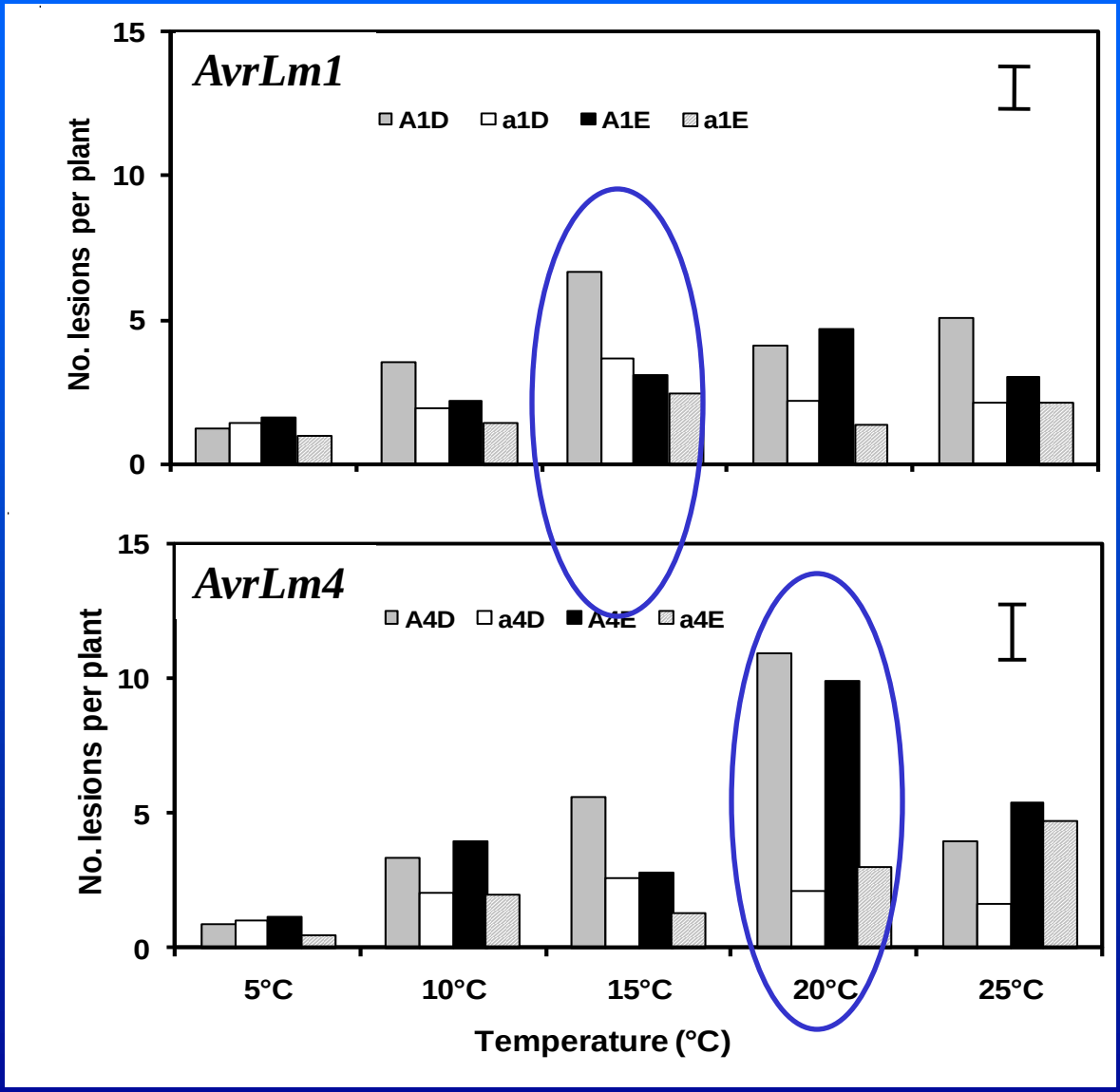
Darmor

DarmorMX (*Rlm6*)

Huang *et al.*, 2006, New Phytologist

Temperature and host background affect pathogen fitness

- More *AvrLm1* than *avrLm1* lesions at 15°C, more *AvrLm4* lesions at 20°C
- More *AvrLm1* lesions on Darmor than on Eurol
- No sign. cultivar effects on *AvrLm4* lesions



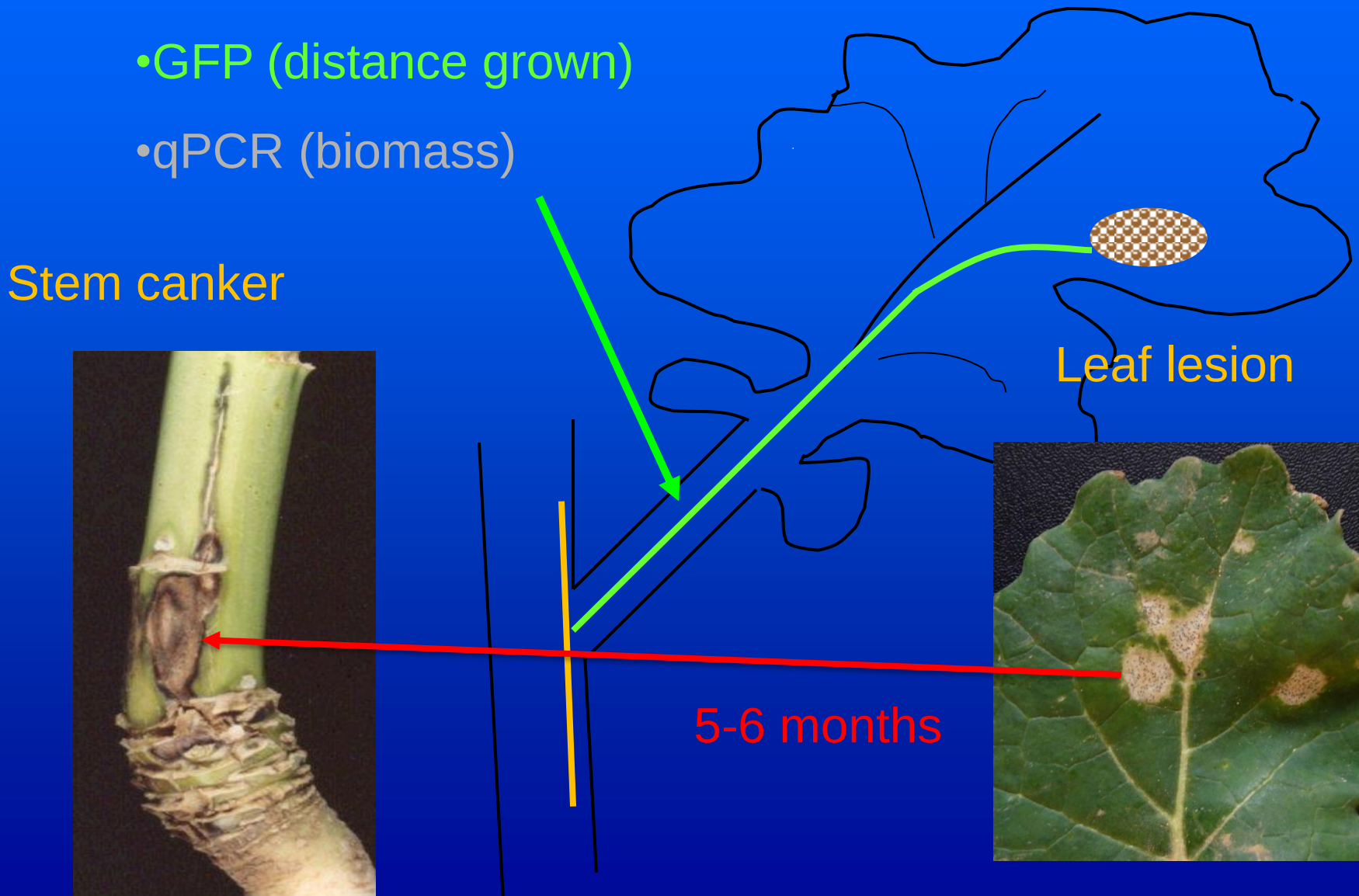
Huang *et al.*, 2010, Eur J Plant Pathol.

Quantitative resistance is durable

- Not race specific
- Difficult to screen for at seedling stage
- Screening for quantitative resistance currently relies on field assessment at harvest
- May operation during long period of symptomless growth after initial leaf infection

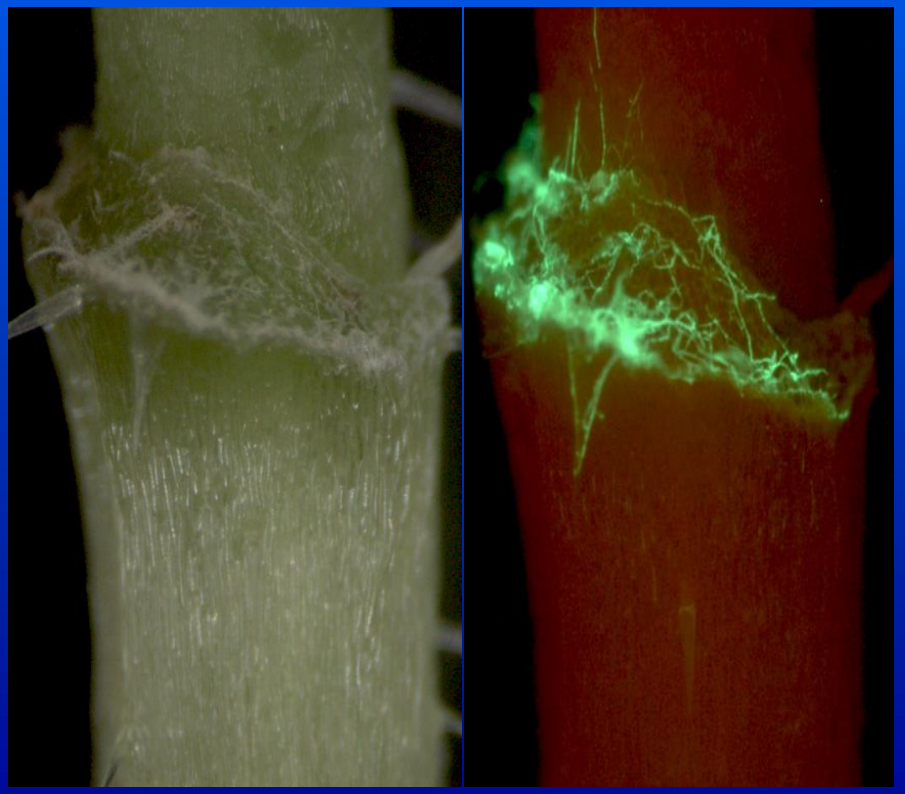
Long period of symptomless growth before the appearance of stem canker

- GFP (distance grown)
- qPCR (biomass)



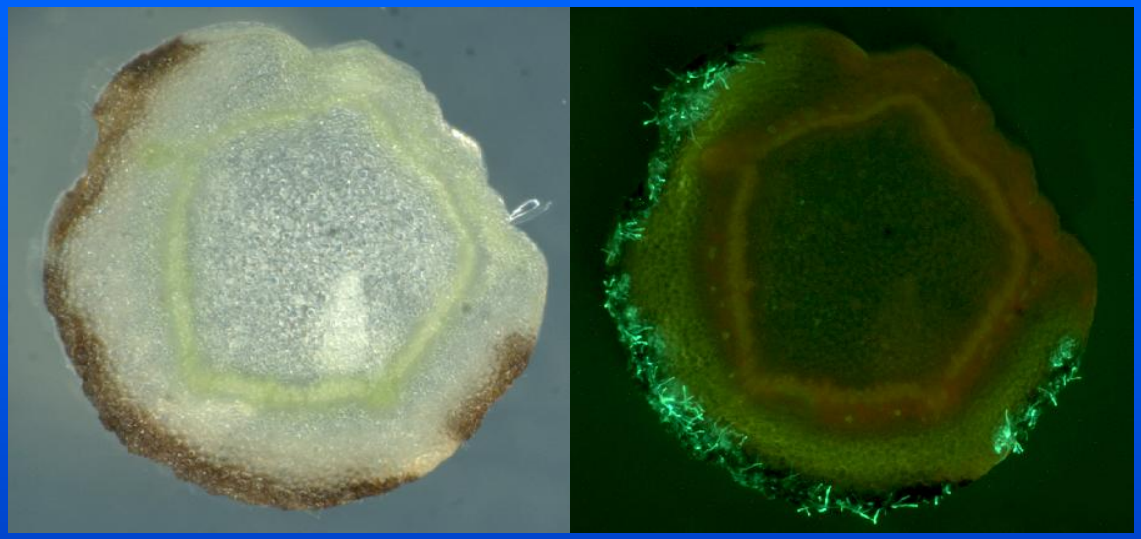
Symptomless growth in petiole

Symptomless growth in stem (external)

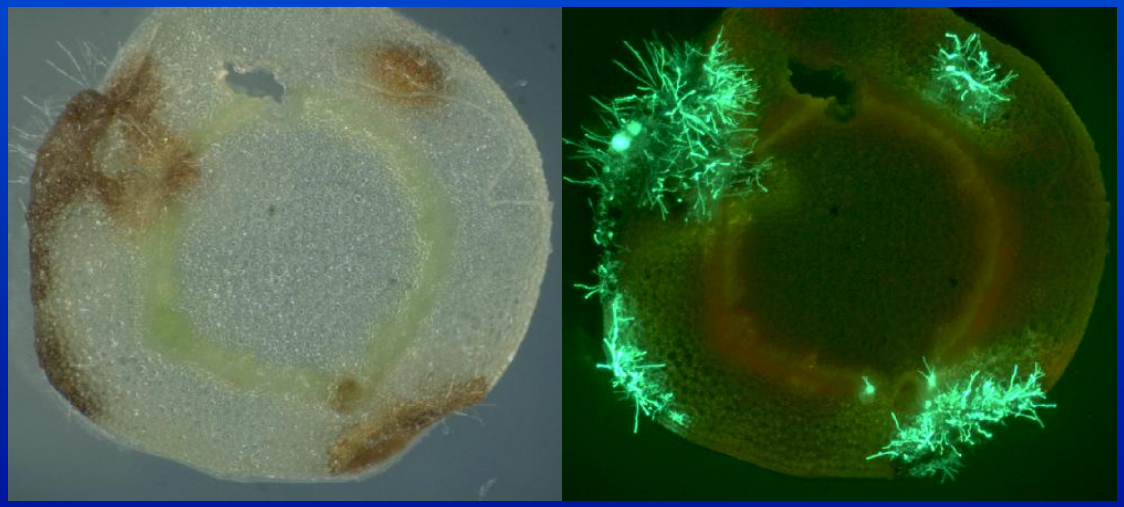


Growth in stem (internal)

Resistant

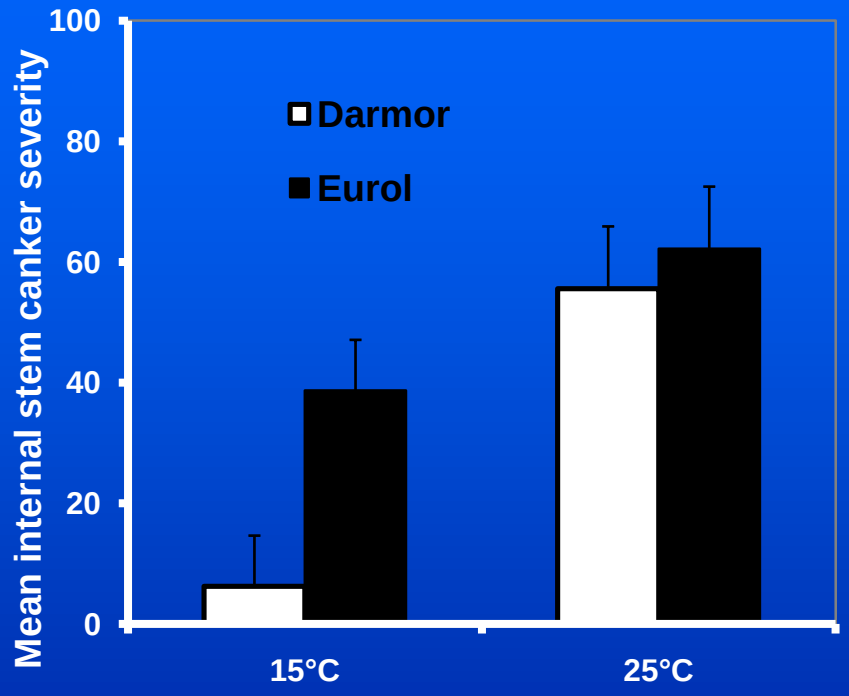


Susceptible



Huang *et al.*, 2009, Plant Pathol.

Temperature affects severity of stem canker in controlled environment



Darmor (with quantitative resistance)

Eurol (without quantitative resistance)

Huang et al., Plant Pathology, 2009

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