Sclerotinia stem rot

What has been done and where are we going….?

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Sclerotinia stem rot of canola

- **Sporadic disease of canola in Australia**
  - Levels of infection can vary from year to year and between districts
- **The causal pathogen - *Sclerotinia sclerotiorum***
  - Wide host range approx. 400 broadleaf species
  - Difficult to control with crop rotation
  - Produces sclerotia
- **Difficult to accurately predict epidemics of disease**
  - Will my crop develop disease..??
  - Do I need to apply a fungicide..??

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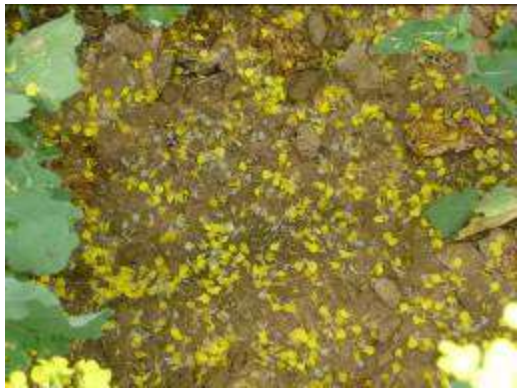



What has been done…

- Surveys for disease incidence
  - Petal infection and stem rot development
  - Southern NSW and Victoria

- Survival of sclerotia under field conditions
  - Impact of fire on survival

- Screening assay
  - Identification of resistance – cotyledons

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What has been done…

- *S. sclerotiorum* population studies
  - Genetic variability within pathogen populations
  - Comparisons of the genetic makeup of isolates at petal infection and stem rot development
  - Genes involved in the infection process
  - Comparisons of isolate morphology and pathogenicity

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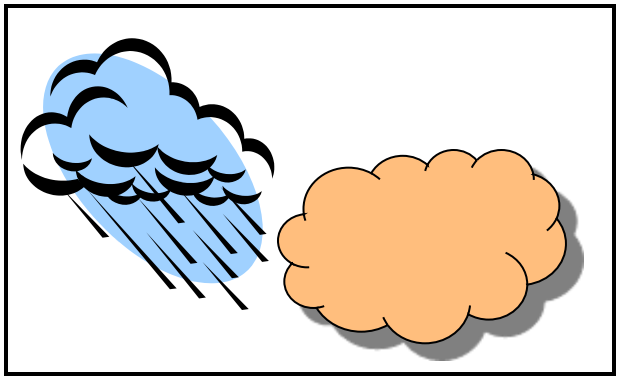
PATHOGEN

DISEASE



ENVIRONMENT

HOST

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Where are we heading…

- National Canola Pathology Project
  - 5 year co-investment with GRDC
  - July 2013 – June 2018
  - University of Melbourne, Marcroft Grains Pathology, NSW-DPI, SARDI, DAFWA, CSIRO
  - Focus on Blackleg and Sclerotinia

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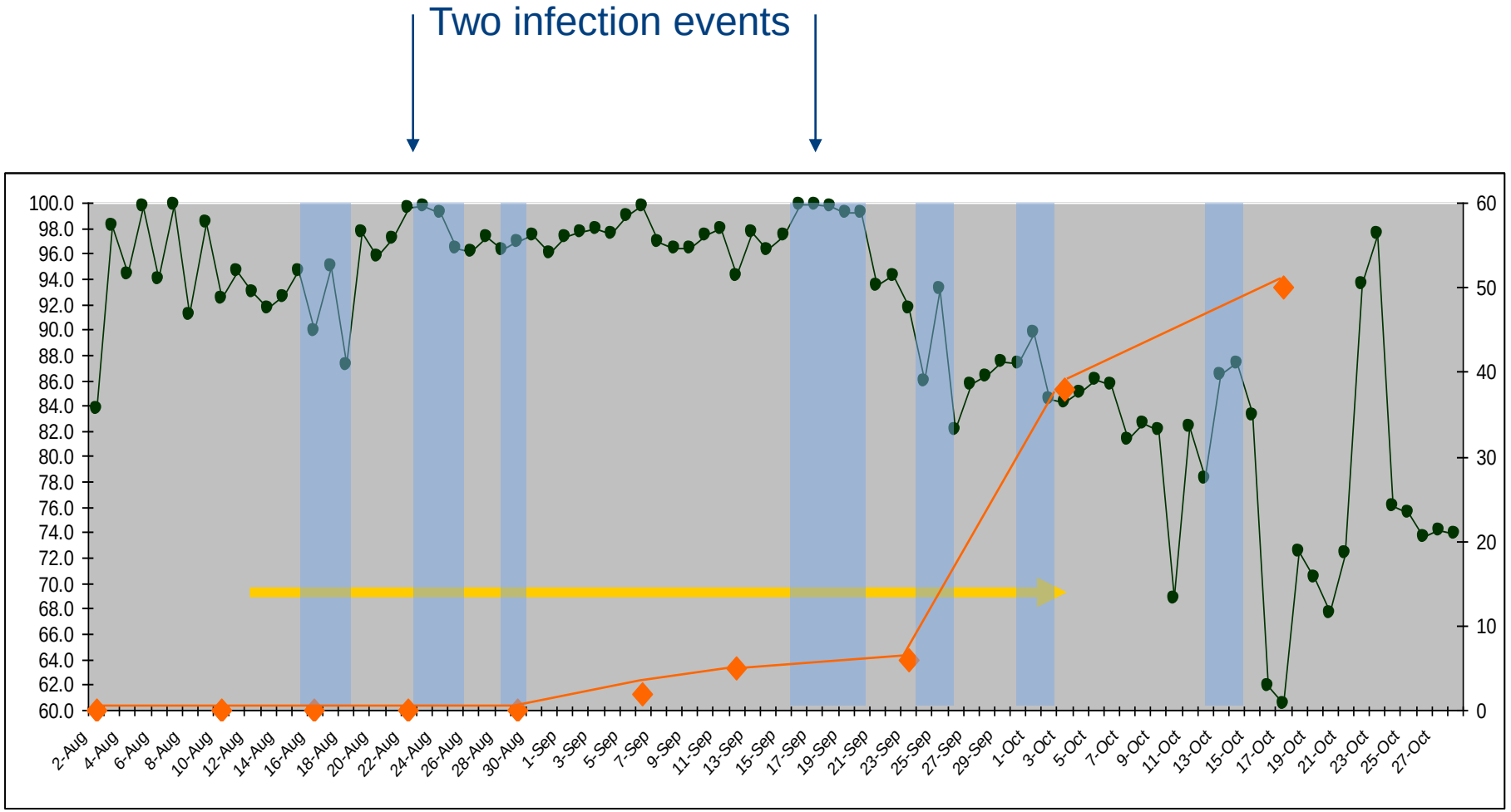
Understanding Sclerotinia

- Epidemiology
  - Increased understanding of epidemics
  - Identification of epidemic ‘trigger points’

- High risk districts
  - Target districts with frequent disease outbreaks
  - Better understanding of the environment

Sclerotinia stem rot development at Howlong



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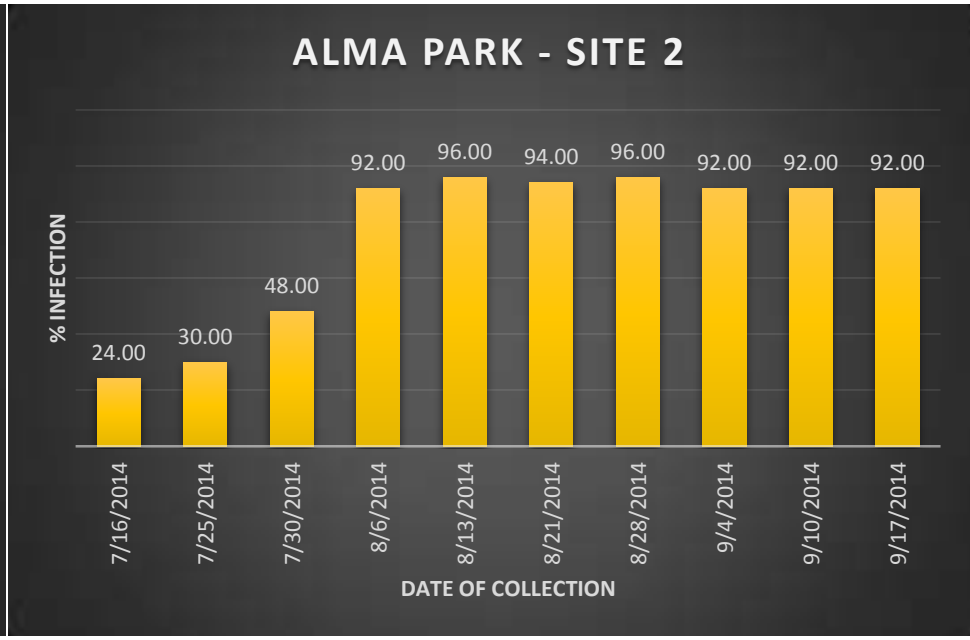
Sclerotinia petal test – NSW 2014



Understanding Sclerotinia

- Yield loss
  - Current reliance on Canadian model
    - % yield loss = ½ % of infected plants
  - Validate yield loss model in Australia
  - Increase confidence in decision making and estimates of economic returns

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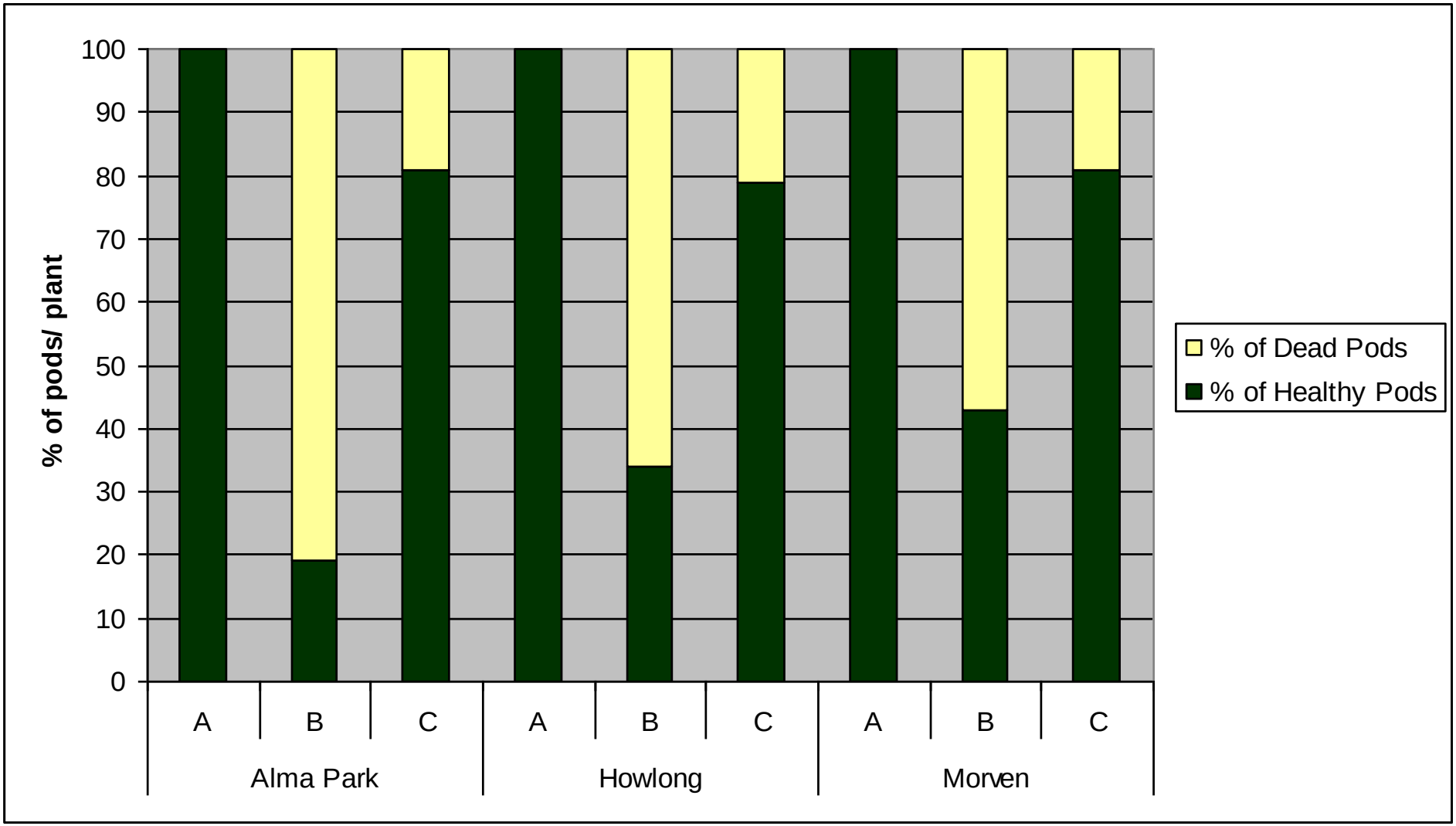
Effect of infection type on podding



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Understanding Sclerotinia

- Management Practices
  - Evaluation of disease management practices
  - Chemical and non-chemical options

- Disease Prediction Model
  - National Pathogen Modelling Project (DAFWA)
  - Results will be used to develop a disease prediction and decision making tool for industry

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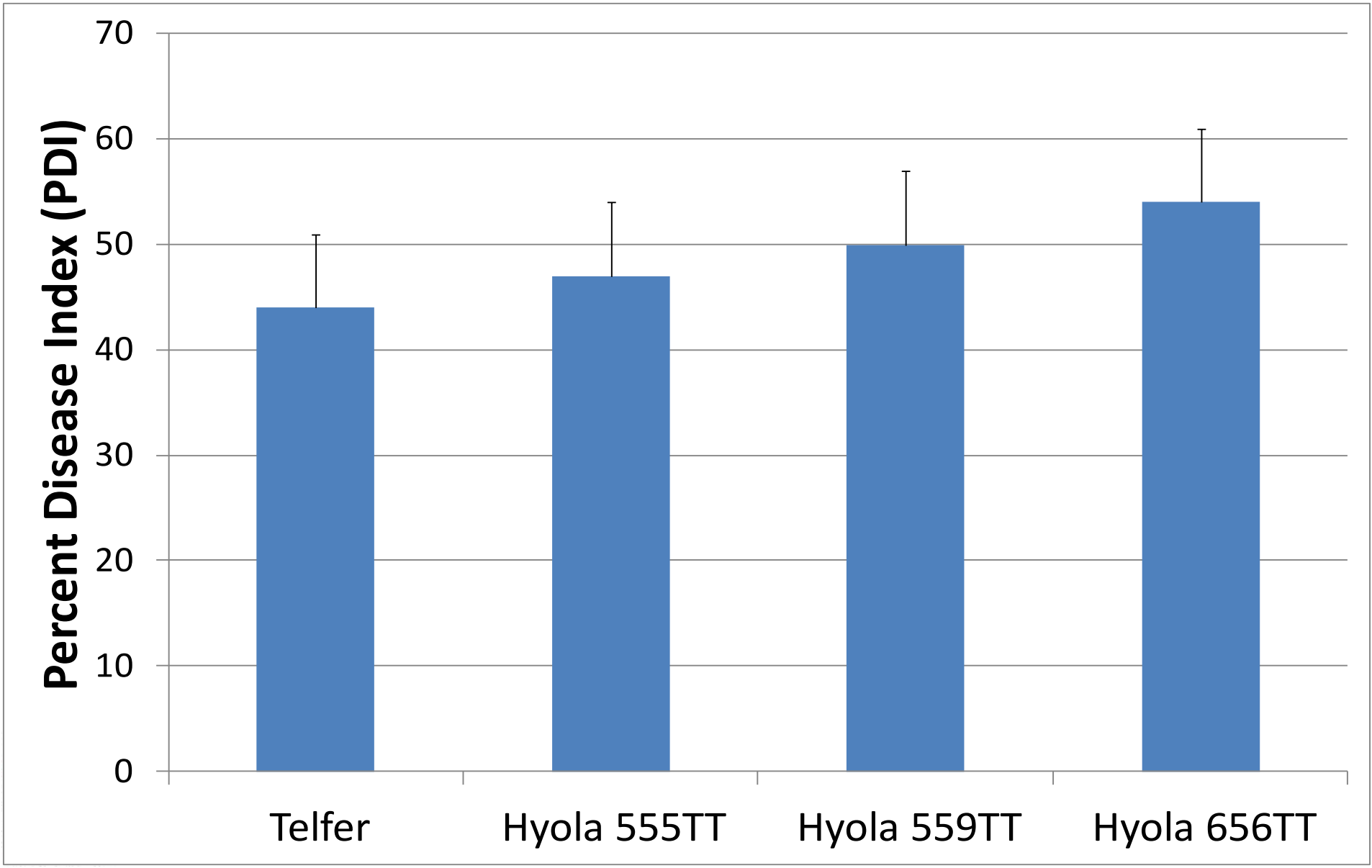
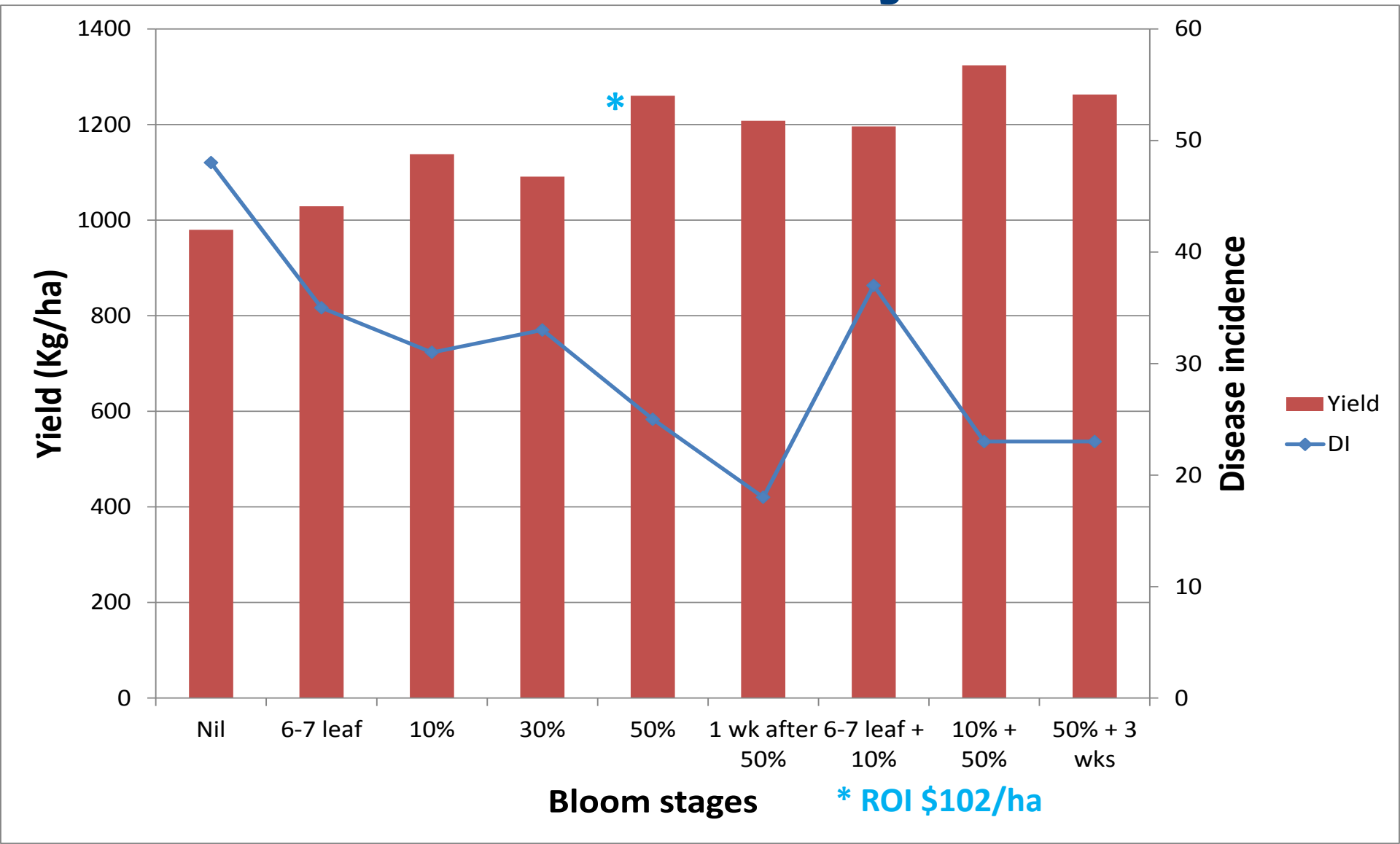
Effect of flowering time on SSR - PDI



Effect of timing of fungicide application on disease incidence and yield



Conclusions

- Reasonable understanding of pathogen and host
- Need to improve understanding of disease epidemiology
  - Epidemic triggers
  - Identify opportunities to exercise control measures
- Development of a disease prediction model and decision support tool
  - Identify disease risk seasons
  - Increase confidence fungicide applications

Acknowledgements

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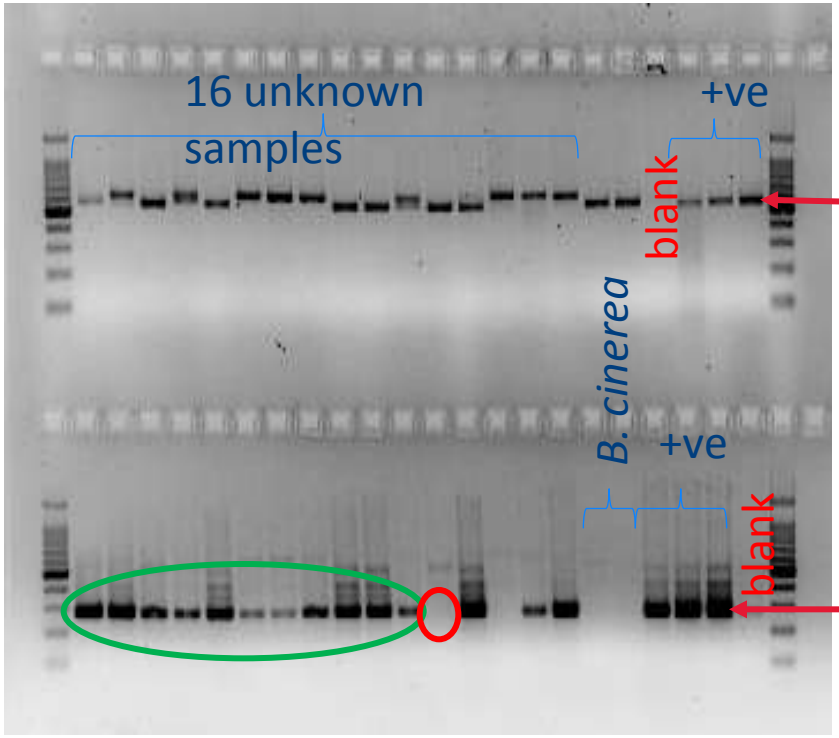
Nested-PCR for rapid detection of sclerotinia

- Detect the presence of viable sclerotinia on petals within 5 days after traditional plating
- Direct PCR
- Specific markers based on 8 SNPs found in the ITS4/ITS5 sequences of *Sclerotinia* spp. and *Botrytis* spp. (Qin et al 2011)
- Distinguish *Sclerotinia* spp. from *B. cinerea*



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