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Australian Canola

Growing from Strength to Strength

Variability of Western Australian Isolates of *Sclerotinia sclerotiorum* and the Potential of Local Biological Control Agents (BCAs)

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DISCOVERERS WELCOME

Overview

- **Introduction**
- **Objective**
- **Variability of WA *Sclerotinia sclerotiorum***
  - *Growth Rate*
  - *Mycelial Colour*
  - *Sclerotial Production*
  - *Pathogenicity*
- **Biological Control**
- **Potential of Local WA BCAs**
- **Conclusion**
- **What's Next?**
- **Acknowledgements**

Introduction

- *Sclerotinia sclerotiorum* → attack > 400 plant species
- Serious problem for Canola production worldwide
- In WA, losses can be up to 40% in worst case scenario

In Australia, potential losses in canola if control strategies un-applied (Murray and Brennan, 2012)

Diseases	$ million
Blackleg	331.3
Beet western yellows	76.9
Sclerotinia stem rot	**39.9**
Hypocotyl rot	20.3
White leaf spot	15.9

Introduction - Objective

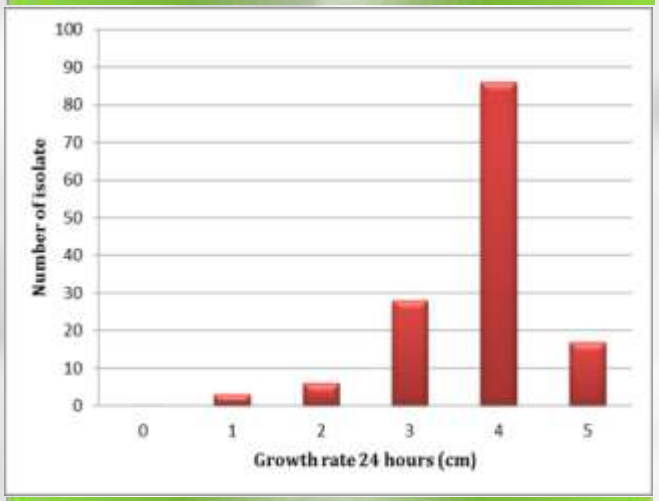
- In WA, Biological Characteristics poorly understood
- Control mainly rely on Fungicides → Impacting the environment and Ecosystem
- Increasing awareness of modern society
- Sustainable Agriculture → Role of BCAs in the future is important

Objective:

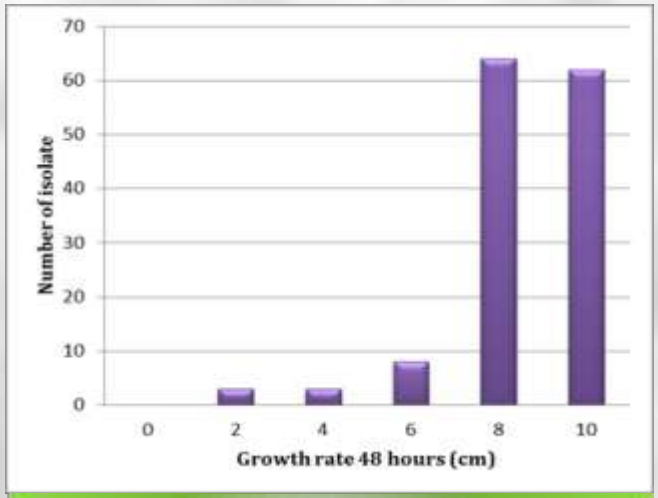
1. To understand the variability of WA isolates of *Sclerotinia sclerotiorum*
2. To explore the potential of local WA Biological Control Agents (BCAs)

Variability - *Growth Rate and Mycelial Colour*

Growth rate

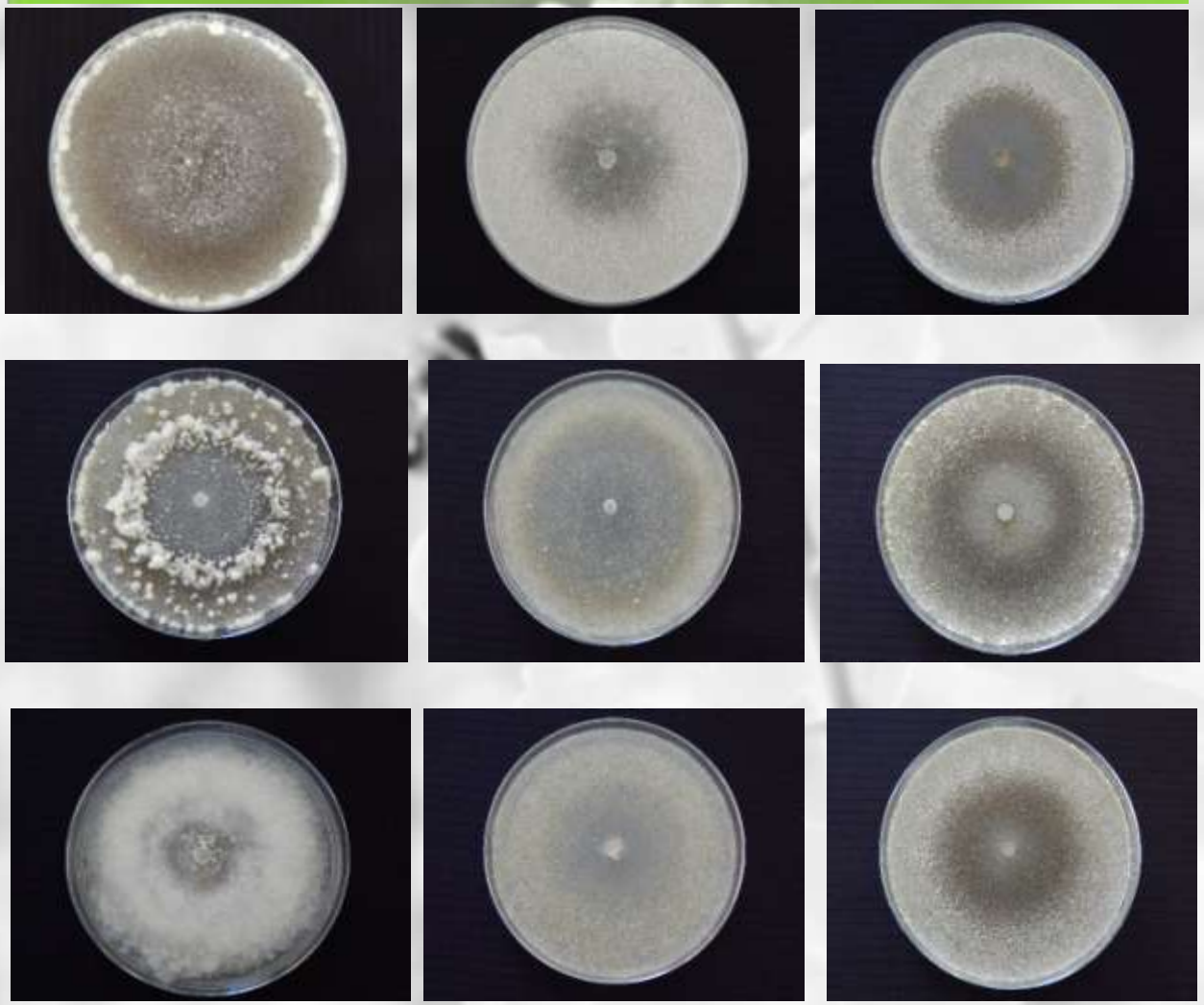


Frequency growth rate of *S. sclerotiorum* 24 hours after sub-culture

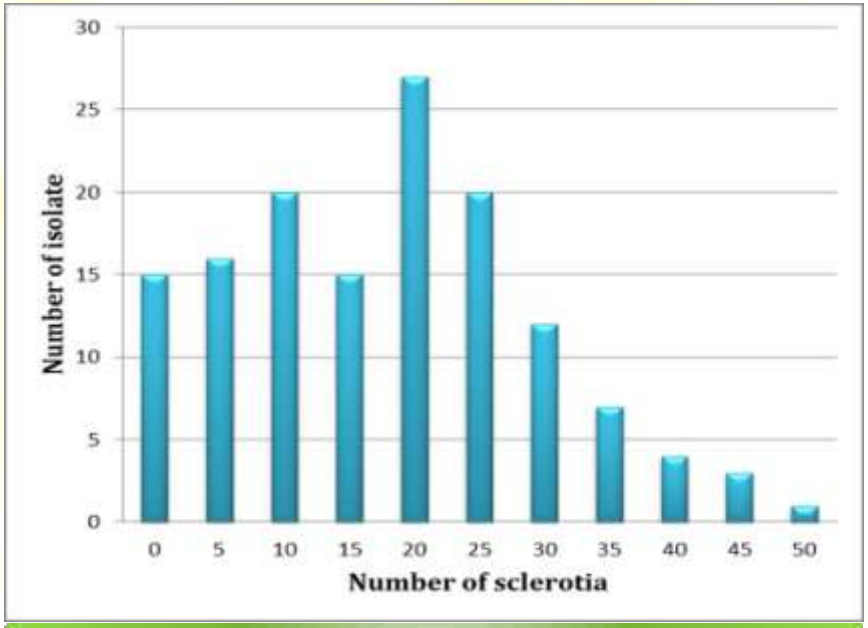


Frequency growth rate of *S. sclerotiorum* 48 hours after sub-culture

Mycelial colour



Variability – *Sclerotia formation*

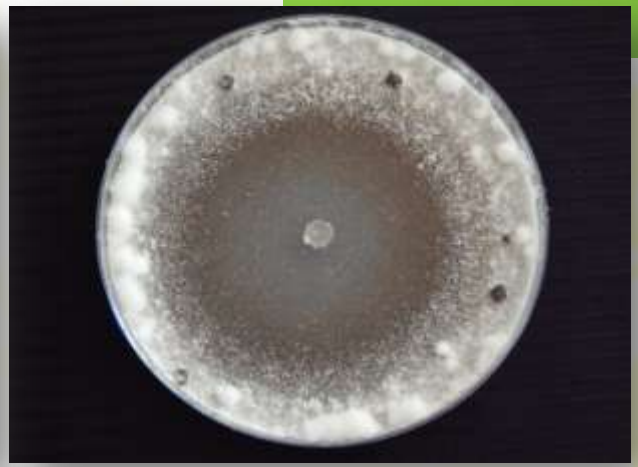


Frequency number of sclerotia produced by *S. sclerotiorum* two weeks after sub-culture

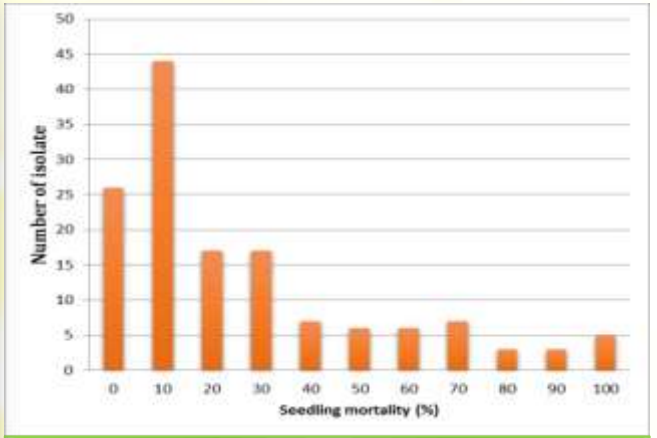
SCLEROTIA

Play a critical role during the growth of *Sclerotinia sclerotiorum*:

1. Unique structure for asexual transition to sexual development.
2. Key for long-term maintenance infection.
3. Reason for management difficulty.



Variability - *Pathogenicity*



Frequency of seedling mortality after 48 hours of treatment in a misting chamber

Pathogenic variations exist among the isolates

Isolate with high pathogenicity

Isolate with low pathogenicity

Control

Frequency of seedling mortality placed for another 48 hours in a growth room

Biological Control

BIOLOGICAL CONTROL is the inhibition of growth, infection or reproduction of one organism using another organism.

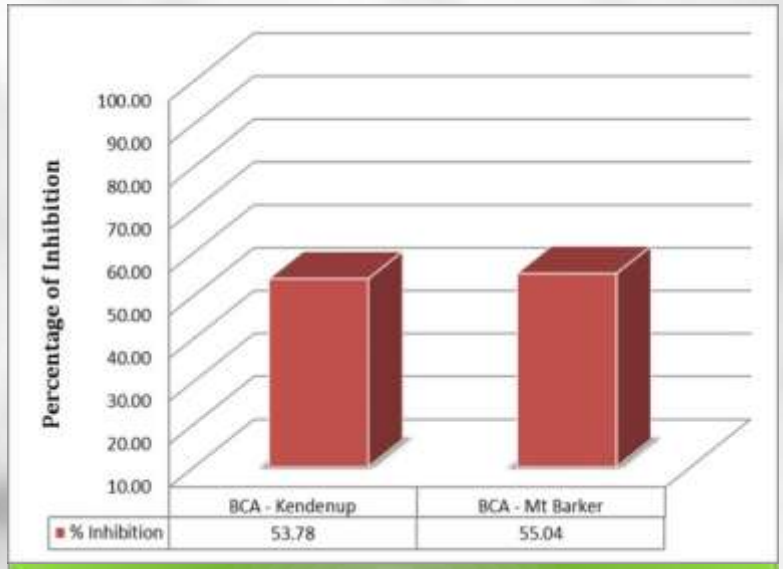
Main mechanism:

1. Hyper parasitism
2. Antibiosis
3. Competition

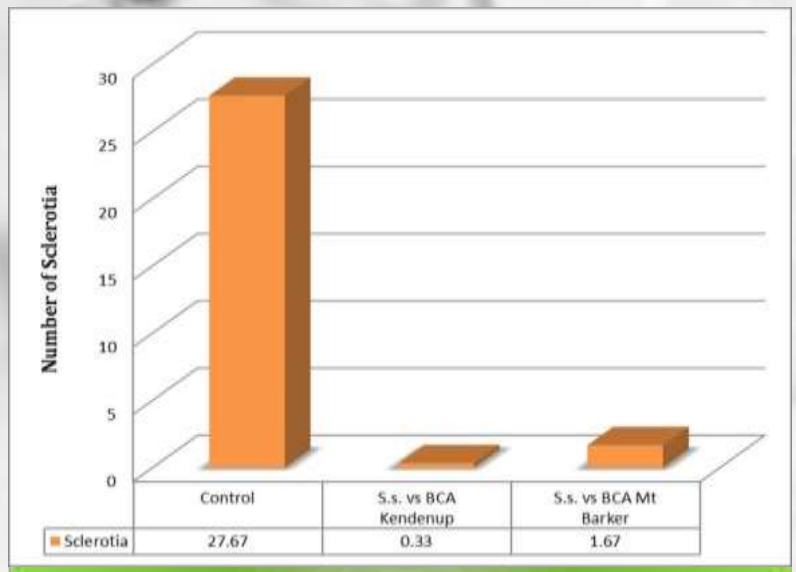
Potential of Local WA BCAs

MTB1 vs Ss

Ss control



Percentage of growth inhibition of *S. sclerotiorum* in the presence of potential biological control agents



Number of sclerotia produced in petri dishes in the presence of biological control agents

Conclusion

- Western Australian isolates of ***Sclerotinia sclerotiorum*** vary in Colour, Growth Rate, Sclerotial Production and Pathogenicity.
- Local WA fungal BCAs has a potential to control growth and sclerotial production of ***Sclerotinia sclerotiorum***

What's Next

- ***Sclerotinia sclerotiorum*** → Mycelial Compatibility Groups (MCGs) and Molecular Analysis
- **BCAs** → Phenotypic and Molecular evaluation; Development of delivery systems; Exploring potential of other fungal and bacterial BCAs; In vivo test in Glass House and Field.

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Thank you very much for your attention !