Choosing the best yielding wheat and barley variety under high crown rot

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GRDC project DAN00175
Talk outline

• The what, where and why should I care
• Wheat varieties and crown rot
  • Met-analysis 2014-2016
  • Evidence from other trials/locations
• Barley varieties and crown rot
• Preliminary oat varieties and crown rot
• Key messages
White heads + honey brown crowns = crown rot

Honey brown crowns

Pink discoloration
Crown rot life-cycle

Minimal in wet seasons

Min.

EXPRESSION
(yield loss)

Max.

NO H₂O STRESS

H₂O STRESS

Moist Soil

SURVIVAL

Favoured wet seasons

INFECTION

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Where is it found in WA? – Stubble plating survey 2012-13

Crown rot incidence in paddocks:
- Nil (0-2%)
- Low (3-10%)
- Medium (11-24%)
- High (>25%)
Inoculum is increasing in WA: same 184 focus paddocks monitored for 6 years

GRDC project DAW00213
‘Putting the focus on profitable crop and pasture sequencing’
PreDicta B, 17 Feb 2017: 22 out of 114 paddocks (19%) medium-high crown rot risk
Wheat & barley yield loss trials, 2014 - 2016

Two locations:
- Wongan Hills
- Merredin

Six wheat & barley trials:
- Nil/low level crown rot at sites
- 12 variety entries
- Paired plots (Nil & inoculated)
- 4 reps
Wheat yield loss – met-analysis 2014-2016

Yield loss (%)

- Justica CL
- Wyalkatchem
- Magenta
- Mace
- Cobra
- Calingiri
- Harper
- Westonia
- Yitpi
- Corack
- Scepter
- Trojan
- Emu Rock

LSD
Wheat grain yield – met-analysis 2014-2016

- Yield without crown rot inoculum
- Yield with crown rot inoculum

Grain yield (t/ha)

Justica CL  Trojan  Wyalkatchem  Yitpi  Harper  Calingiri  Westonia  Cobra  Corack  Mace  Magenta  Scepter  Emu Rock

\* LSD

0.3 t/ha
Wheat % screenings – met-analysis 2014-2016

- % Screenings with crown rot inoculum
- % Screenings without crown rot inoculum

I LSD

% Screenings

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<th>Variety</th>
<th>% Screenings with inoculum</th>
<th>% Screenings without inoculum</th>
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<td>Westonia</td>
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<td>Emu Rock</td>
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<td>Harper</td>
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Yield response to inoculum, Wongan Hills 2015

- Emu Rock (MS)
- Mace (S)
- Durum (VS)

GRDC project DAW00245
‘Yield response curve for host resistance to crown rot’
Farm trials – paddocks with high crown rot, 2013

Salmon Gums

0.32 t/ha

Lake Grace

0.38 t/ha

Ag zone 5, NVT trial averages:

Mace 3.43 t/ha
Emu Rock 3.28 t/ha
Disease in wheat varieties, Salmon Gums NVT 2014

NVT crown rot rating:
- Moderately susceptible (MS)
- Susceptible (S)

Emu Rock 0.2 t/ha
more than Mace

Whiteheads plot score (0-10)

1.4 t/ha

1.8 t/ha

1.6 t/ha
What about barley?
Barley yield loss – met-analysis 2014-2016

NVT susceptibility ratings: S – SVS for most barley varieties
Barley grain yield – met analysis 2014-2016

- Yield with crown rot inoculum
- Yield without crown rot inoculum

Grain yield (t/ha)

I LSD

Barley varieties: Bass, Baudin, GrangeR, Stirling, Flinders, Commander, Scope CL, Mundah, Rosalind, Fathom, Hindmarsh, Spartacus CL, Compass, La Trobe, Litmus
Barley % screenings – met-analysis 2014-2016

- % Screenings change with crown rot inoculum
- % Screenings without crown rot inoculum

LSD

Bannister, Carrolup, Durack, Mitika, Kojonup, Williams, & Yallara

DAFWA funded through the Boosting Grains Research and Development project
Preliminary oat yield loss to crown rot, 2016

Pingelly

Merredin

Yield loss (%)
Key messages

• All wheat and barley varieties suffered yield loss
• Consistently better yielding varieties were identified:
  • Wheat: Emu Rock
  • Barley: Litmus and La Trobe
• Oat assessments underway
Thank you

Merredin and Wongan Hills Research Station staff
Shahajahan Miyan
Growers
Funding GRDC and DAFWA
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