Sustainability of continuous wheat sequences in relation to crown rot in the low rainfall Eastern Wheatbelt

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BACKGROUND

- Wheat after wheat is common in WA, especially in low rainfall areas and on loamy soils
- This is despite the well known benefits of break crops for system sustainability
- Can management of continuous wheat prolong system sustainability?

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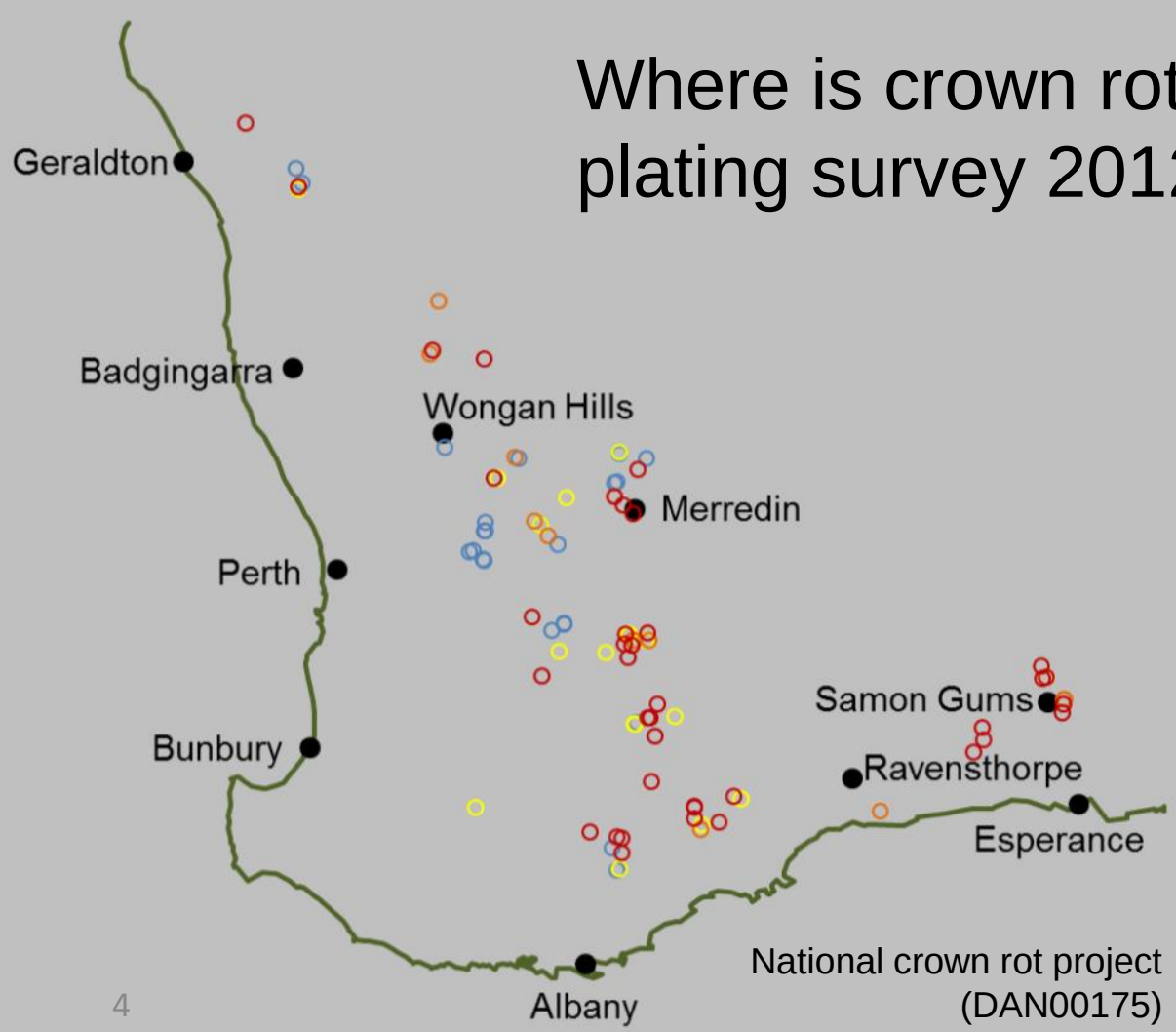
Where is crown rot in WA? – Stubble plating survey 2012-2013



Crown rot incidence in paddocks:

- Nil (0-2%)
- Low (3-10%)
- Medium (11-24%)
- High (>25%)

National crown rot project (DAN00175)

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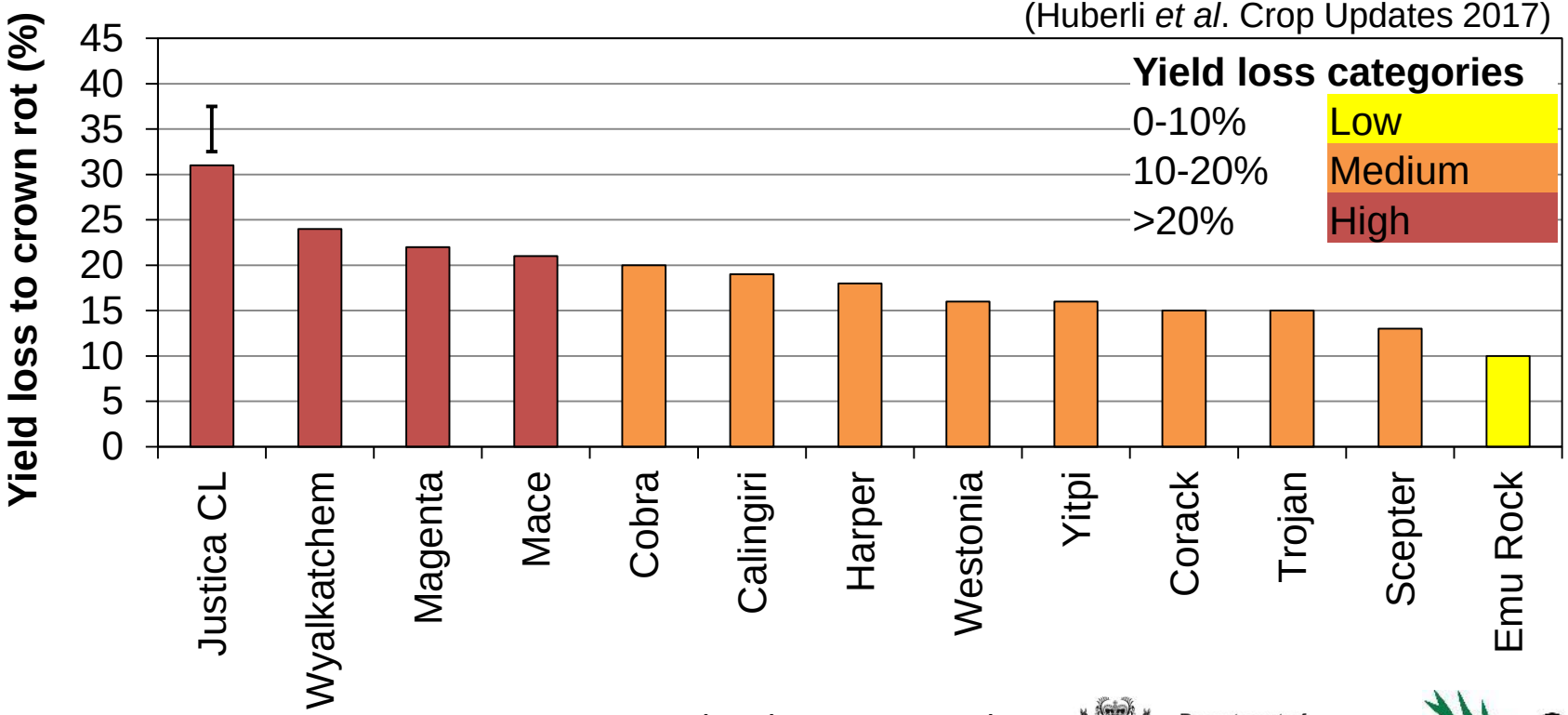
Wheat yield loss – met-analysis 2014-2016

(Huberli *et al*. Crop Updates 2017)



National crown rot project
(DAN00175)

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TRIAL DESIGN

Six sequences

2015	2016	2017	2018
Wheat	Wheat	**Wheat**	Wheat
Canola	Wheat	**Wheat**	Wheat
Fallow	Wheat	**Wheat**	Wheat
Fallow	Canola	**Wheat**	Wheat
Canola	Fallow	**Wheat**	Wheat
Wheat	Fallow	Canola	Wheat

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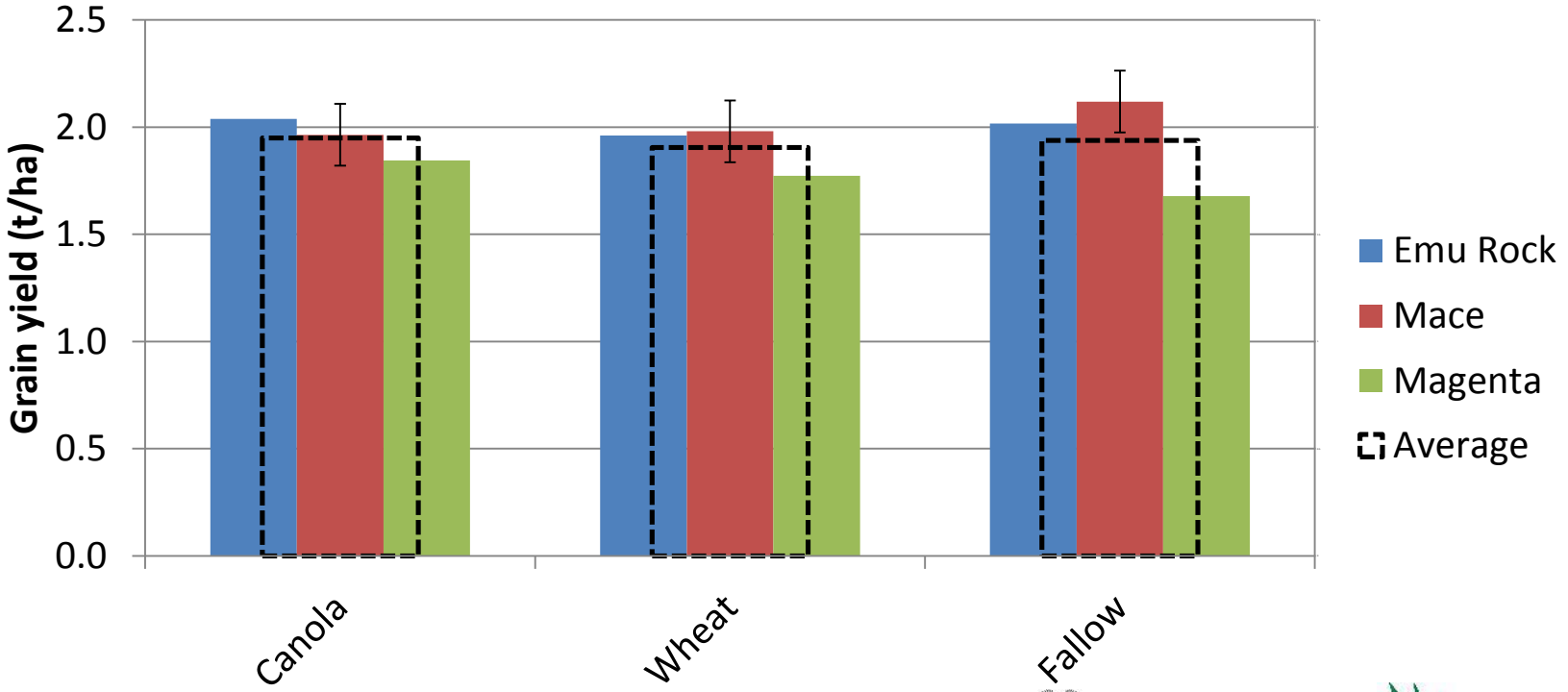
Previous crop did not affect wheat yield in 2016



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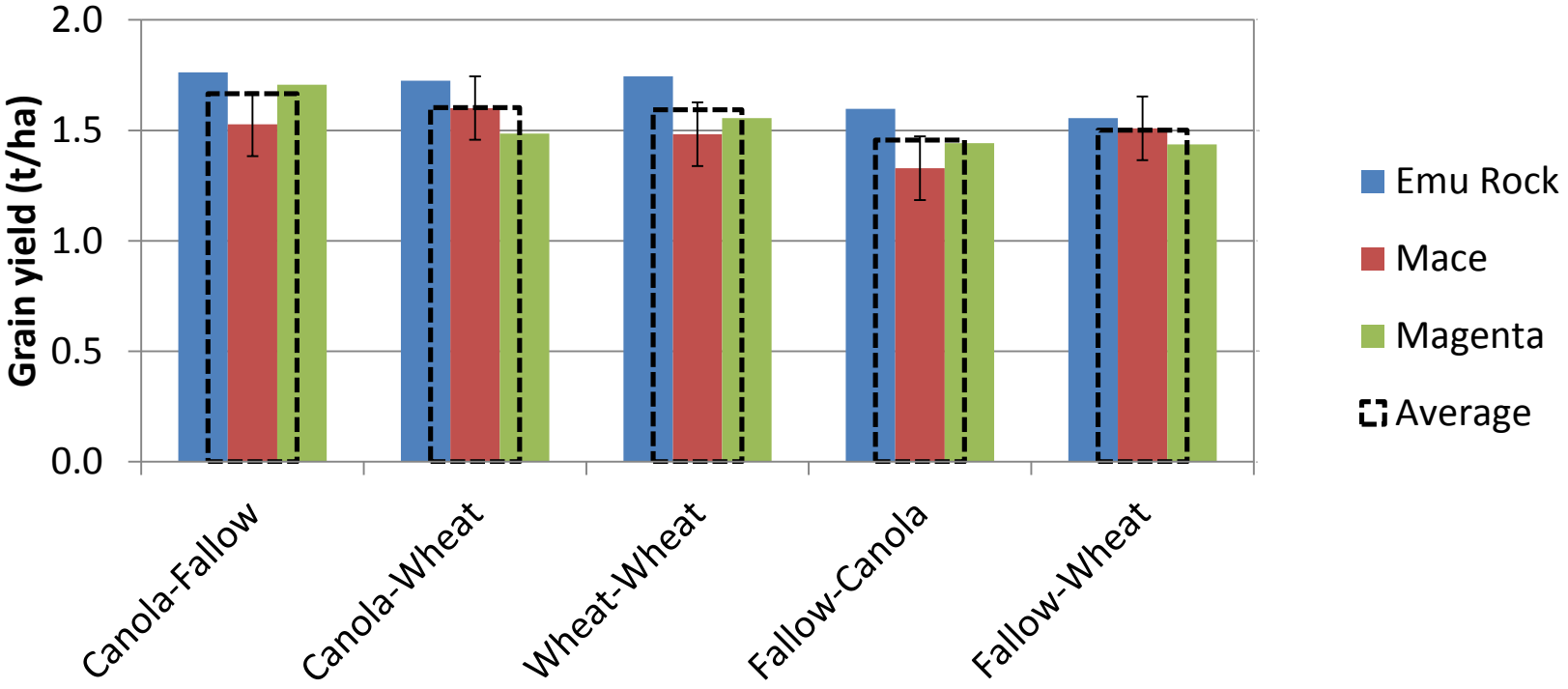
Sequence did not affect wheat yield in 2017



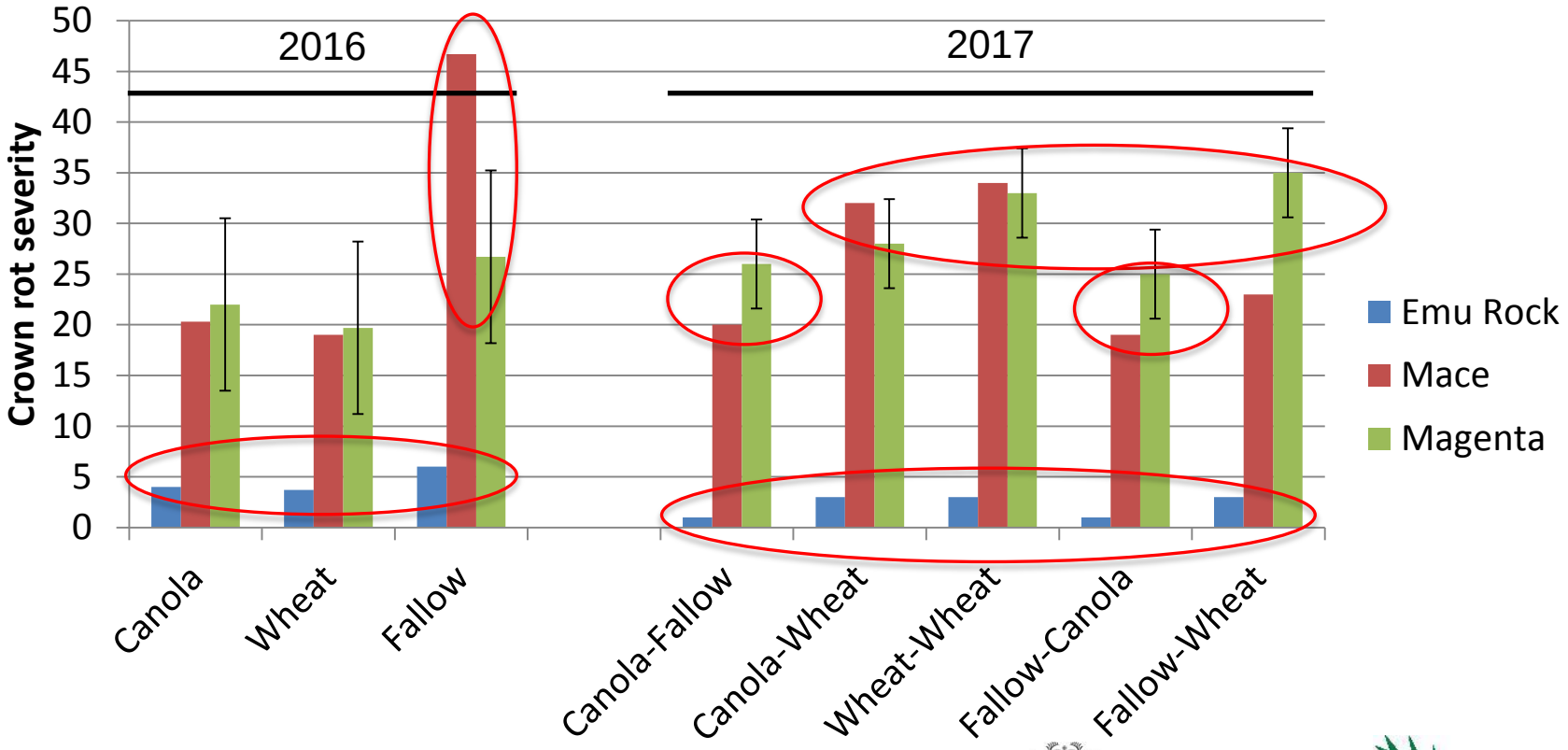
Initial crown rot levels were high

- In 2015 crown rot organism isolated from ~12% of crowns remaining from 2014*
- Predicta B: high levels of crown rot DNA in soil, low or nil levels of other soil borne diseases

* GRDC National Crown Rot Project (DAN00175)

Crown rot expression

Sequence and cultivar both affect crown rot severity



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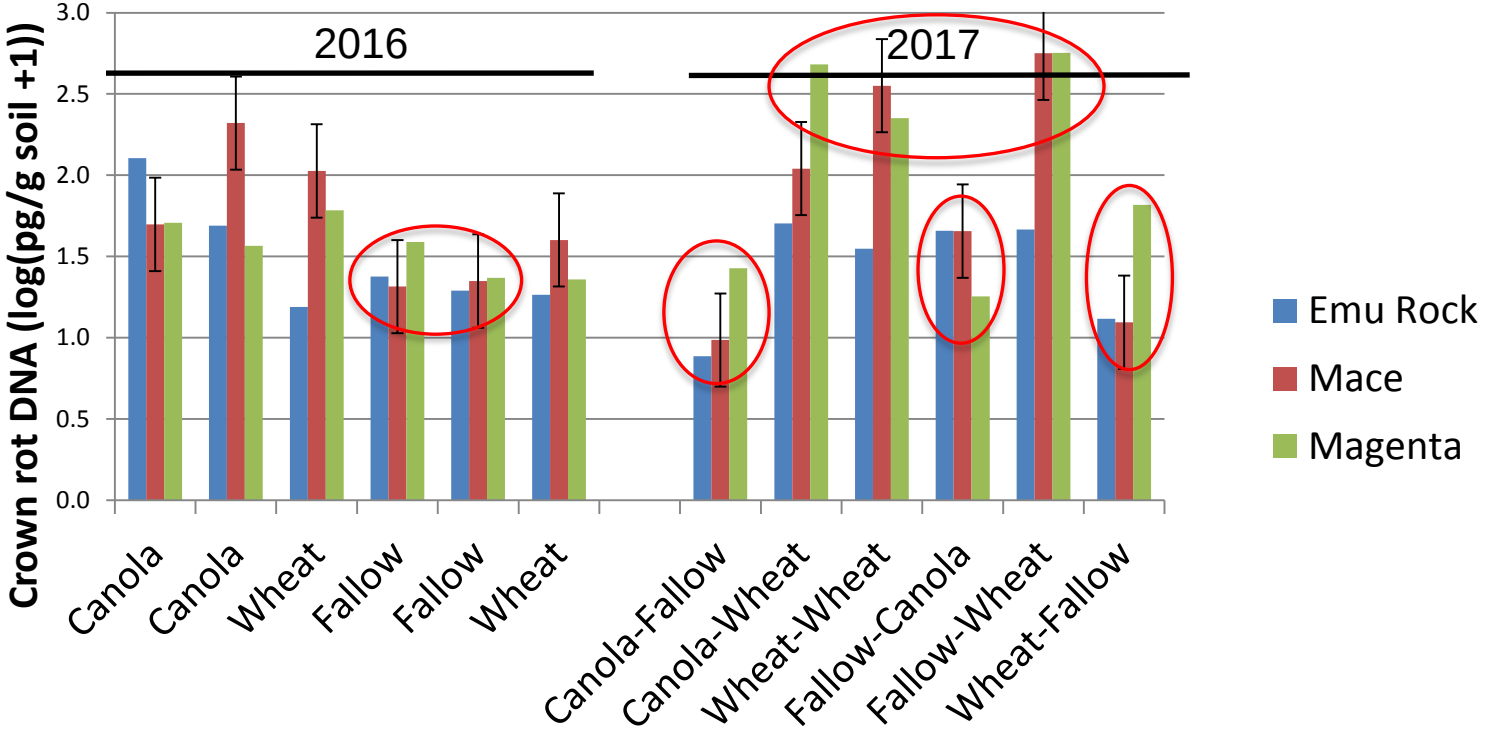
Sequence and cultivar both affect soil crown rot DNA levels



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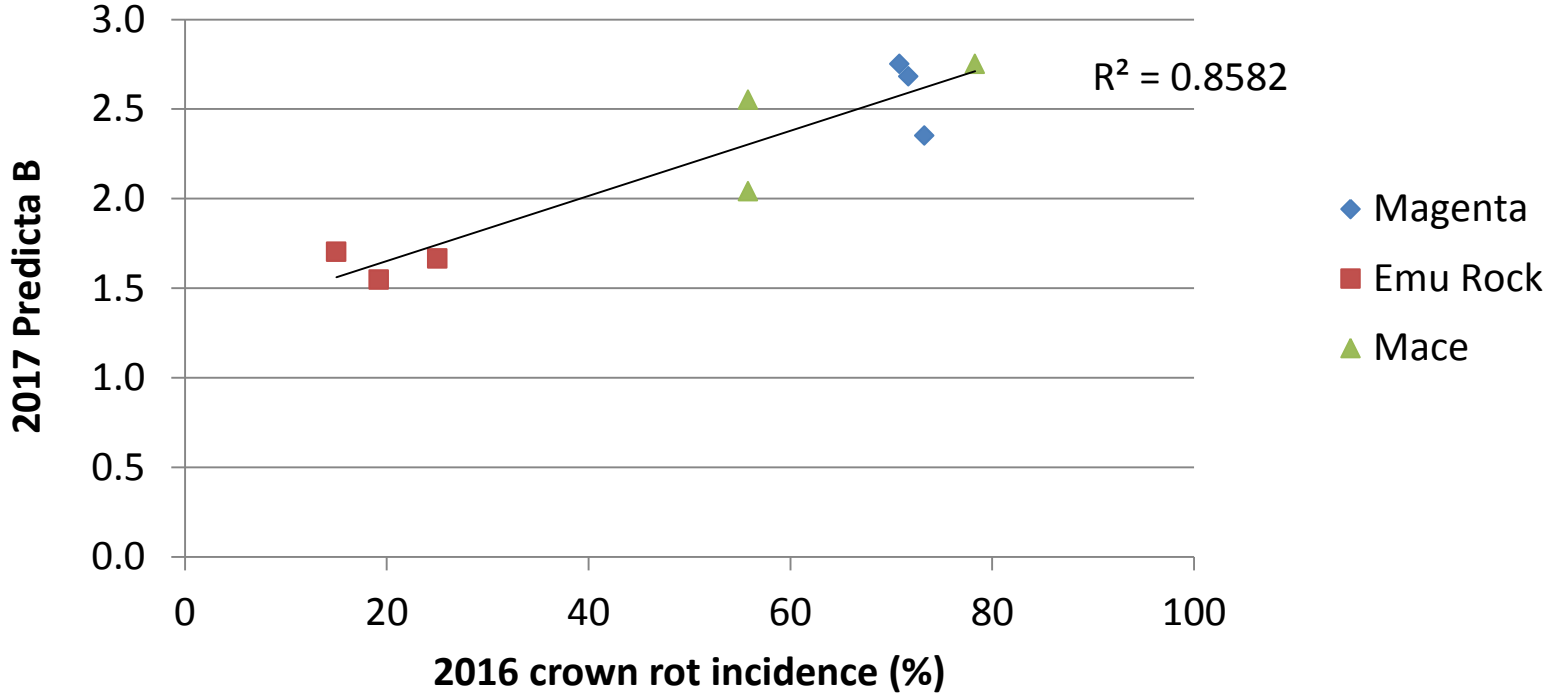
Soil DNA levels are related to crown rot severity in previous year



Sequence and crop competitiveness affect ryegrass head numbers

Me m² in October

	2015	2016	2017
All cropped plots	18		
Fallow	<1	<1	<1
Canola		14	
Wheat after wheat		2	9
Wheat after canola			20
Emu Rock – cont. wheat			45
Emu Rock – after canola			54

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CONCLUSIONS

- Continuous wheat can be sustainable for at least 4 years on a loamy soil with a crown rot background

- Emu Rock has lower crown rot expression than Mace or Magenta and lower inoculum carry-over to the following season.

- Competitive crops are crucial in preventing weed blowouts

Thank you

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