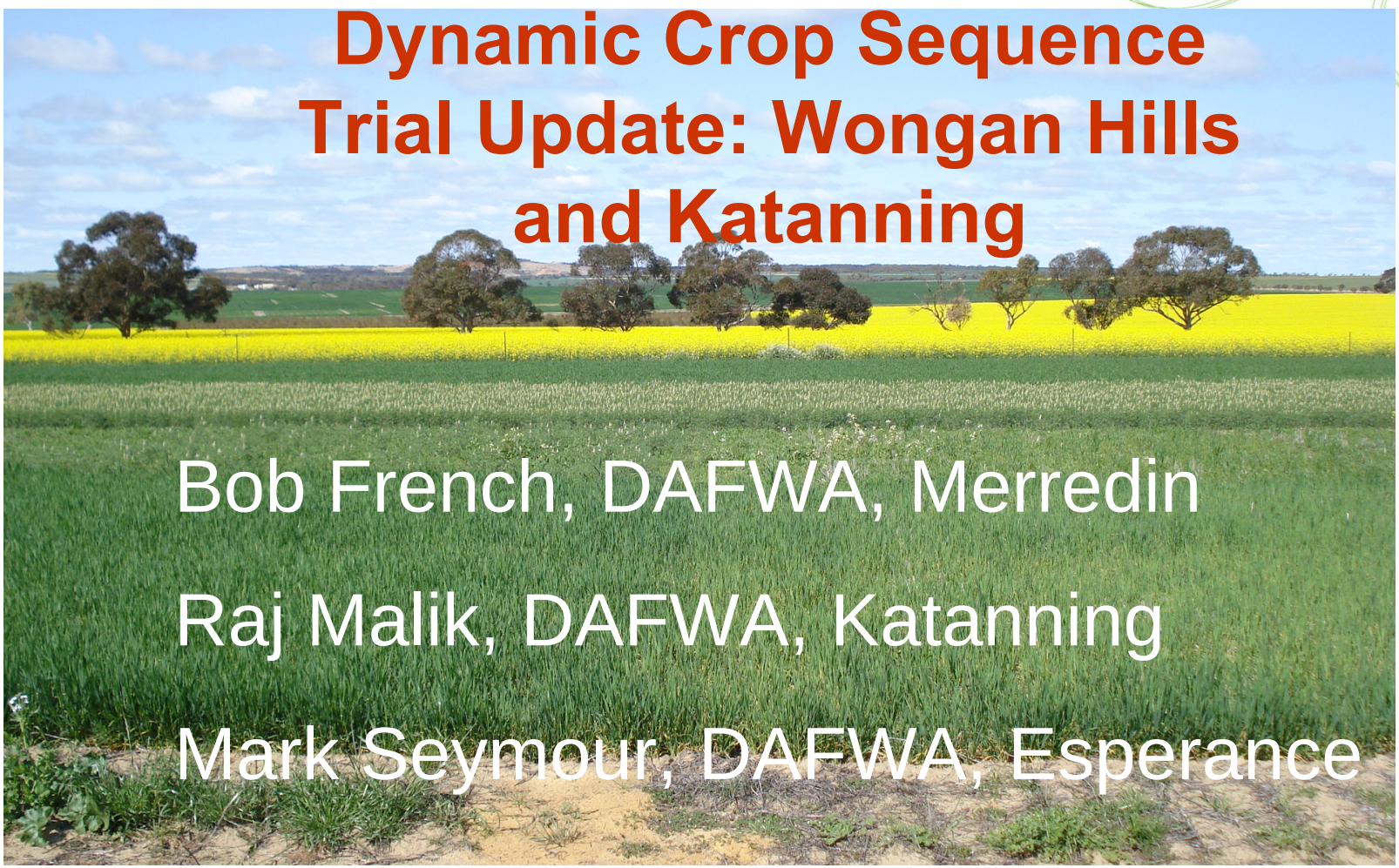
Dynamic Crop Sequence Trial Update: Wongan Hills and Katanning



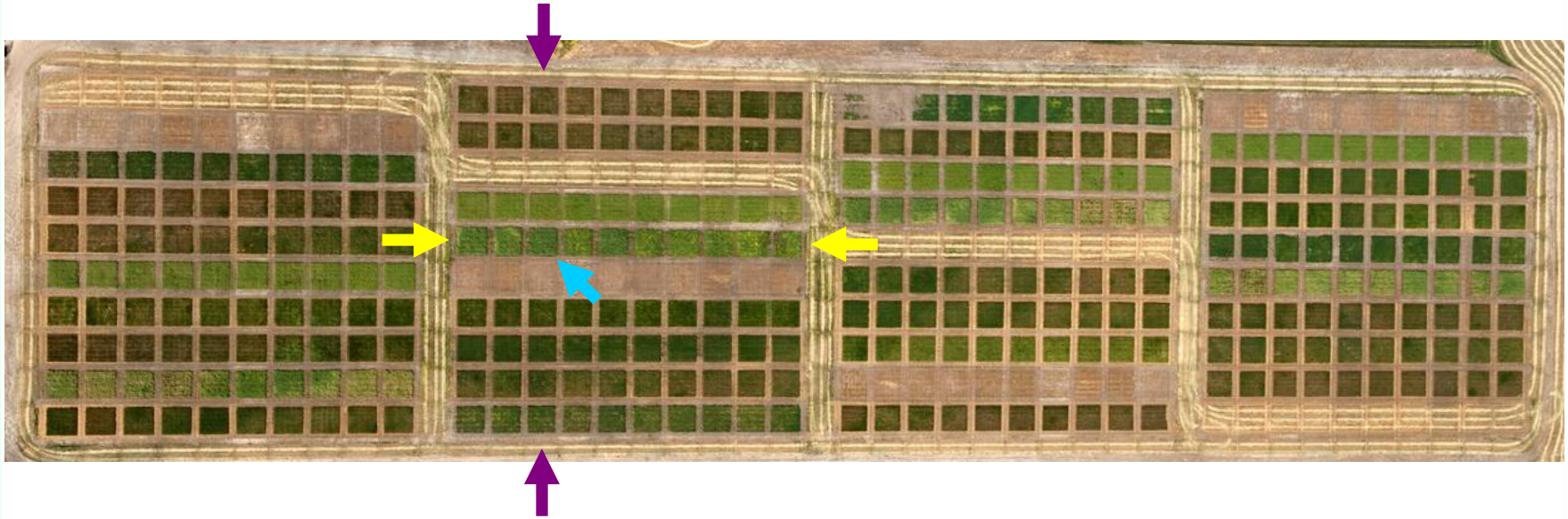
Bob French, DAFWA, Merredin

Raj Malik, DAFWA, Katanning

Mark Seymour, DAFWA, Esperance

What are we talking about?

- Developed at USDA NGPL Mandan ND
- 10 × 10 matrix design



Why do them?

WA cropping systems are complex and dynamic

Under the influence of many factors:

- Physical
- Biological
- Economic

Optimal sequence extremely context dependant

WA Trials

"Crop" components

Katanning	Wongan Hills
Wheat	Wheat
Wheat + Jockey	Wheat (mouldboard)
Barley	Barley
Oats for grain	Oaten hay
Oaten hay	TT canola
TT canola	Juncea or RR canola
Lupins	Lupins
Field peas	Volunteer pasture
Green manure	French serradella
Fallow	Fallow

WA trials

Some context

Katanning

- Mildly acid shallow duplex soil
- May to October rainfall

  306 mm in 2008

  332 mm in 2009

  191 mm in 2010
- Late May breaks in all 3 years

WA trials

Some context

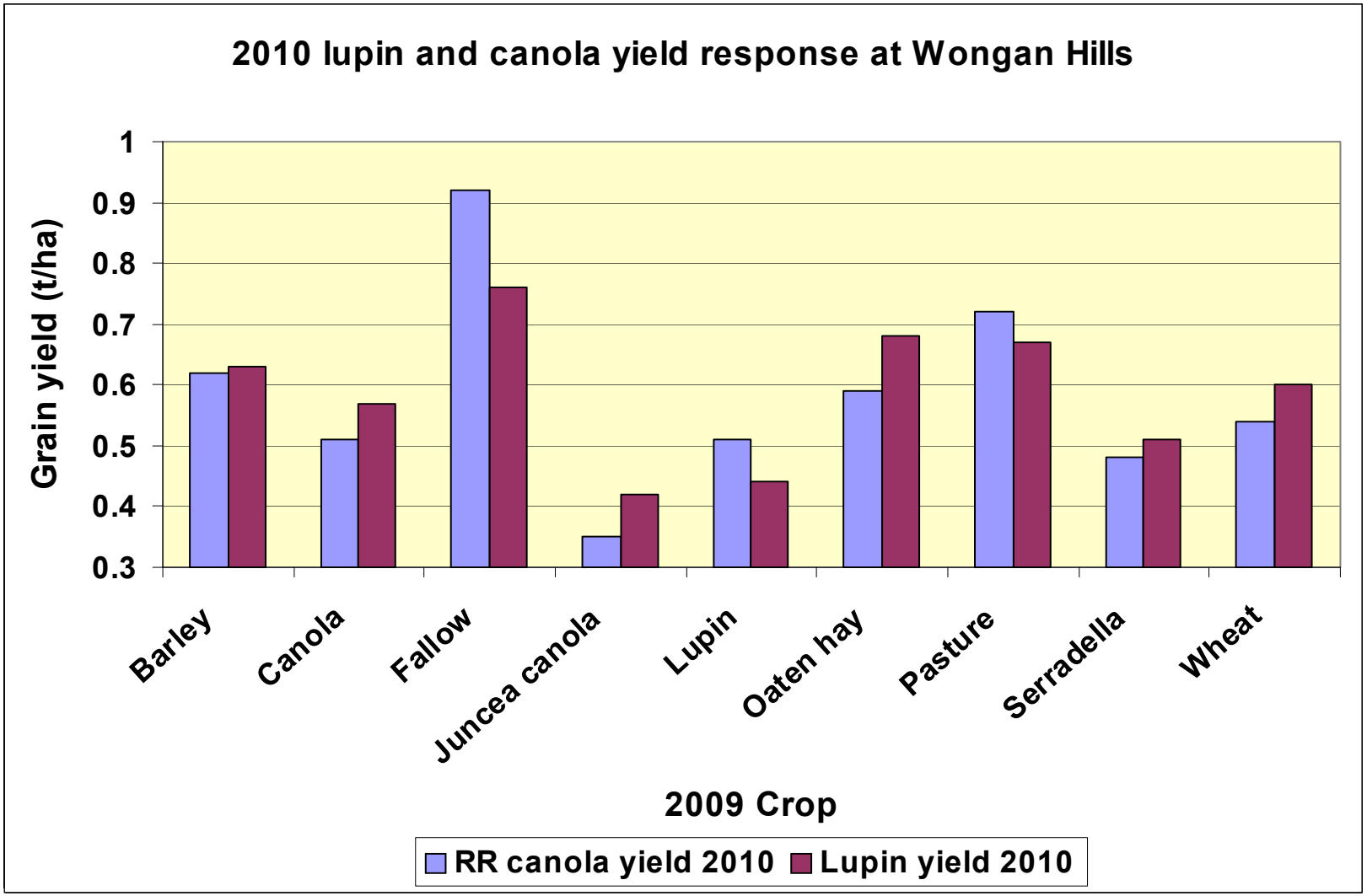
Wongan Hills

- Mildly acid deep earthy sand over gravel
- Three years pasture prior to 2009
- May to October rainfall

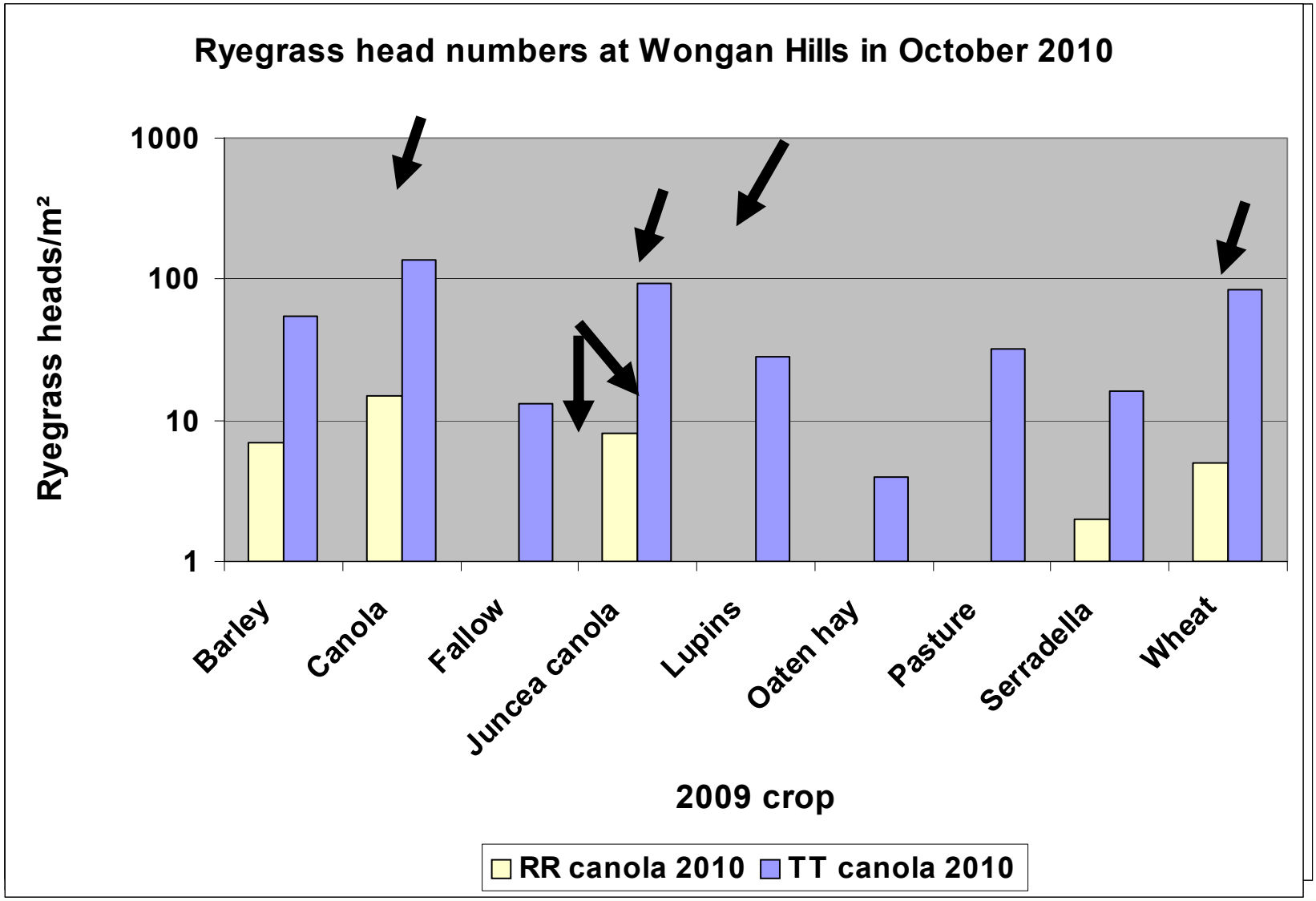
  231 mm in 2009

  132 mm in 2010
- late May breaks in both years

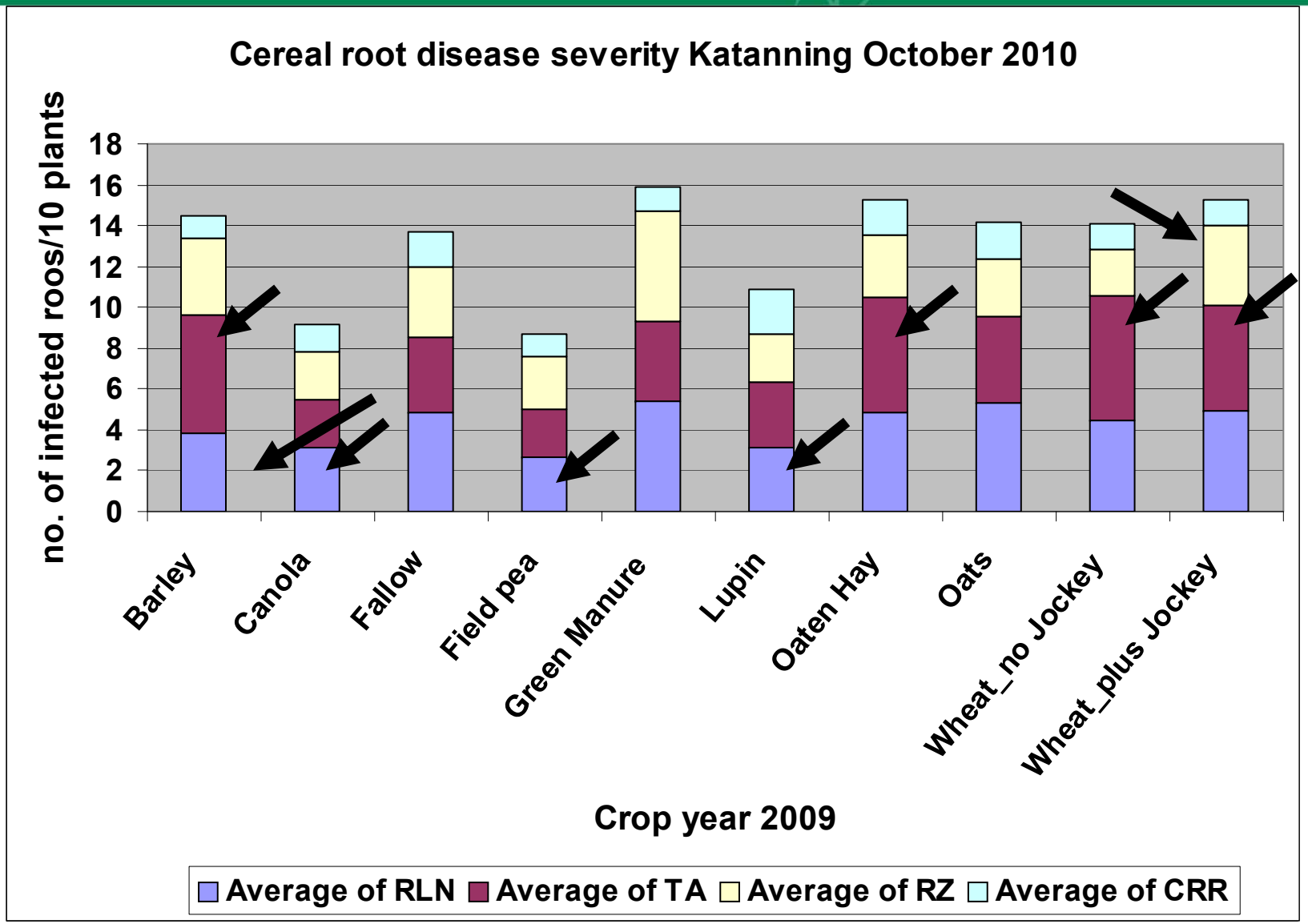
Yield response



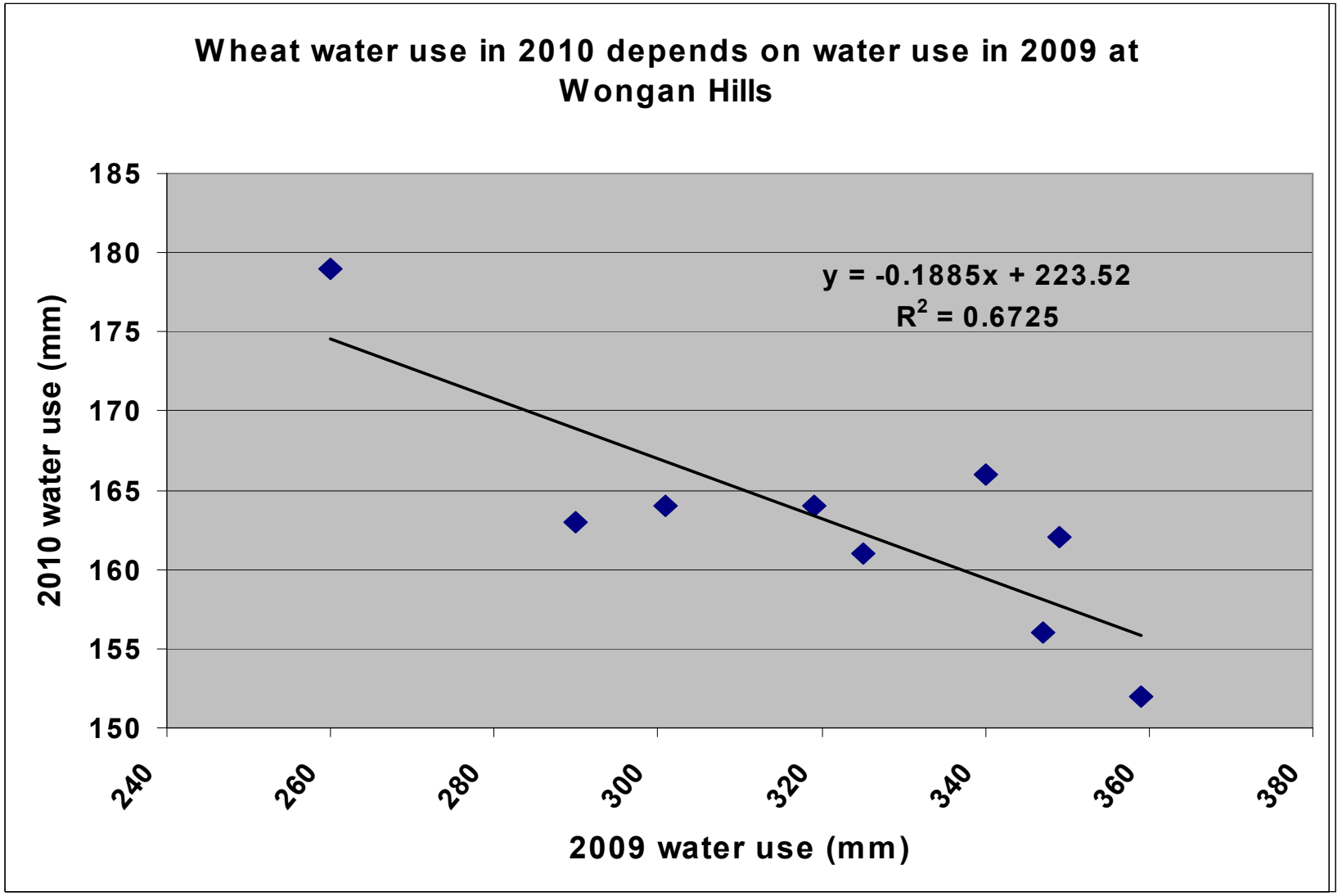
Weeds


Ryegrass head numbers at Wongan Hills in October 2010
Ryegrass heads/m²
1000
100
10
1
Barley
Canola
Fallow
Juncea canola
Lupins
Oaten hay
Pasture
Serradella
Wheat
2009 crop
RR canola 2010
TT canola 2010

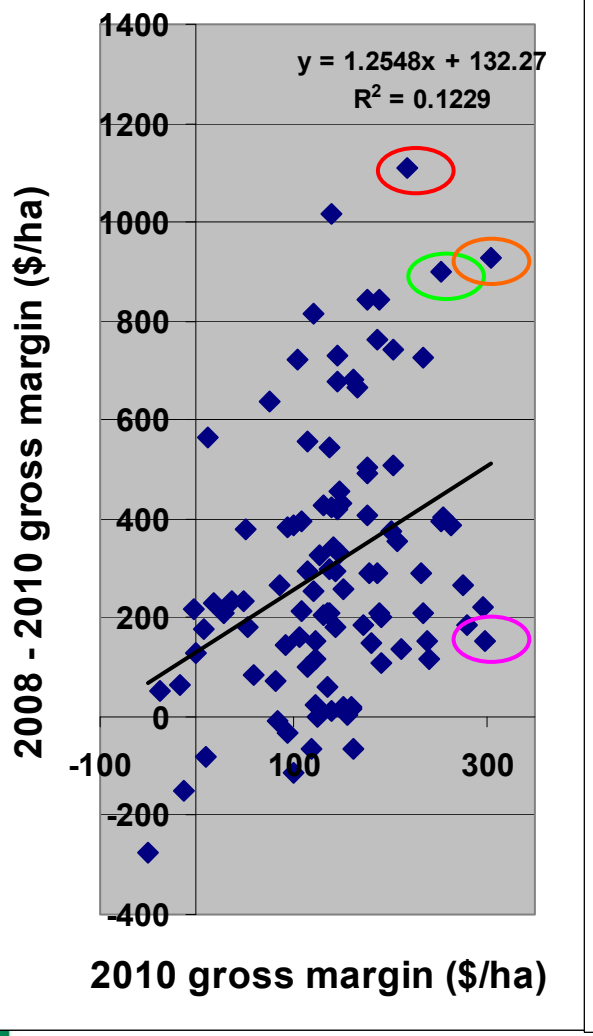
Soil borne disease

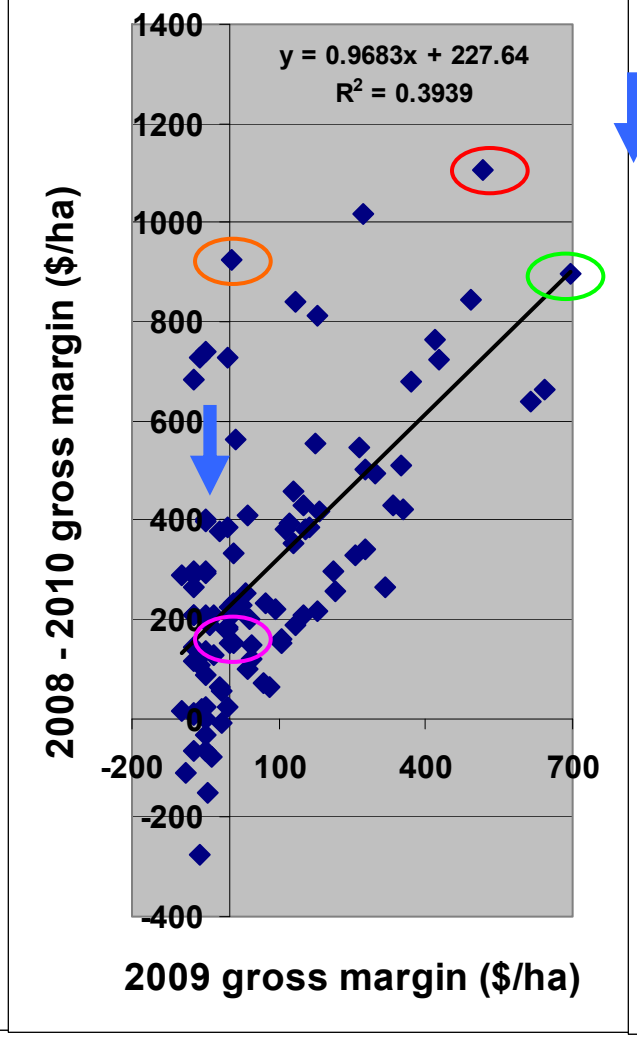


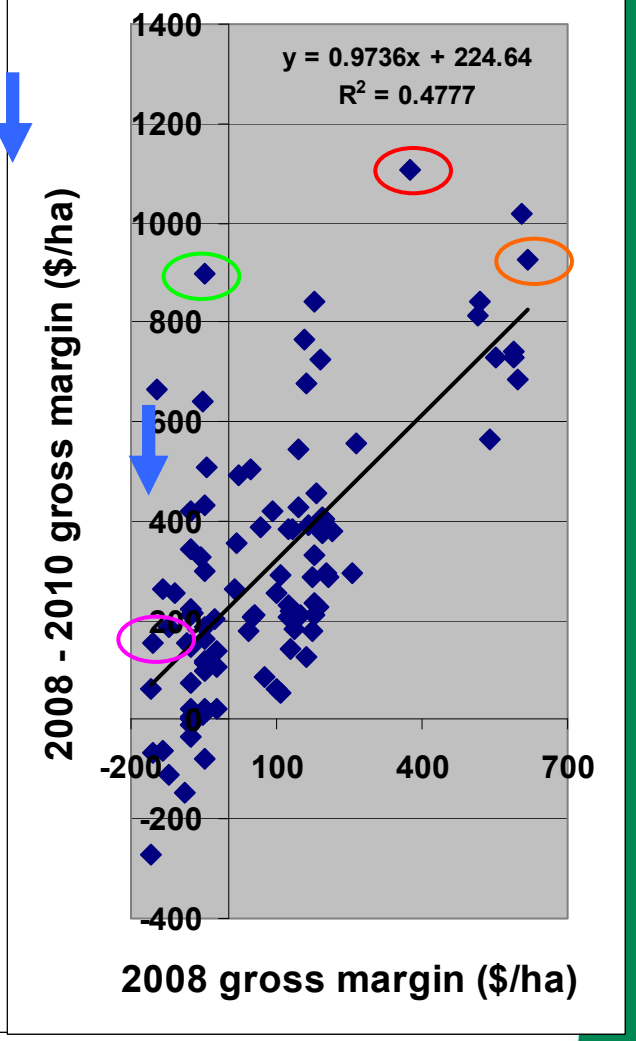
Soil water use



Economics


y = 1.2548x + 132.27
R2 = 0.1229
2008 - 2010 gross margin ($/ha)
2010 gross margin ($/ha)
1400
1200
1000
800
600
400
200
0
-200
-400
-100
100
300


y = 0.9683x + 227.64
R2 = 0.3939
2008 - 2010 gross margin ($/ha)
2009 gross margin ($/ha)
1400
1200
1000
800
600
400
200
0
-200
-400
-200
100
400
700


y = 0.9736x + 224.64
R2 = 0.4777
2008 - 2010 gross margin ($/ha)
2008 gross margin ($/ha)
1400
1200
1000
800
600
400
0
-200
-400
-200
100
400
700

Conclusions

- Crop sequence can affect weed populations, crop disease severity, and water availability
- How these affect crop yield depends on the specific characteristics of the site and season
- Sequence effects can last at least two years
- Most profitable sequences do not necessarily produce highest yields

Conclusions

- Long term profitability requires significant responses to compensate for years of low gross margin

Acknowledgements

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- GRDC for funding

The End