

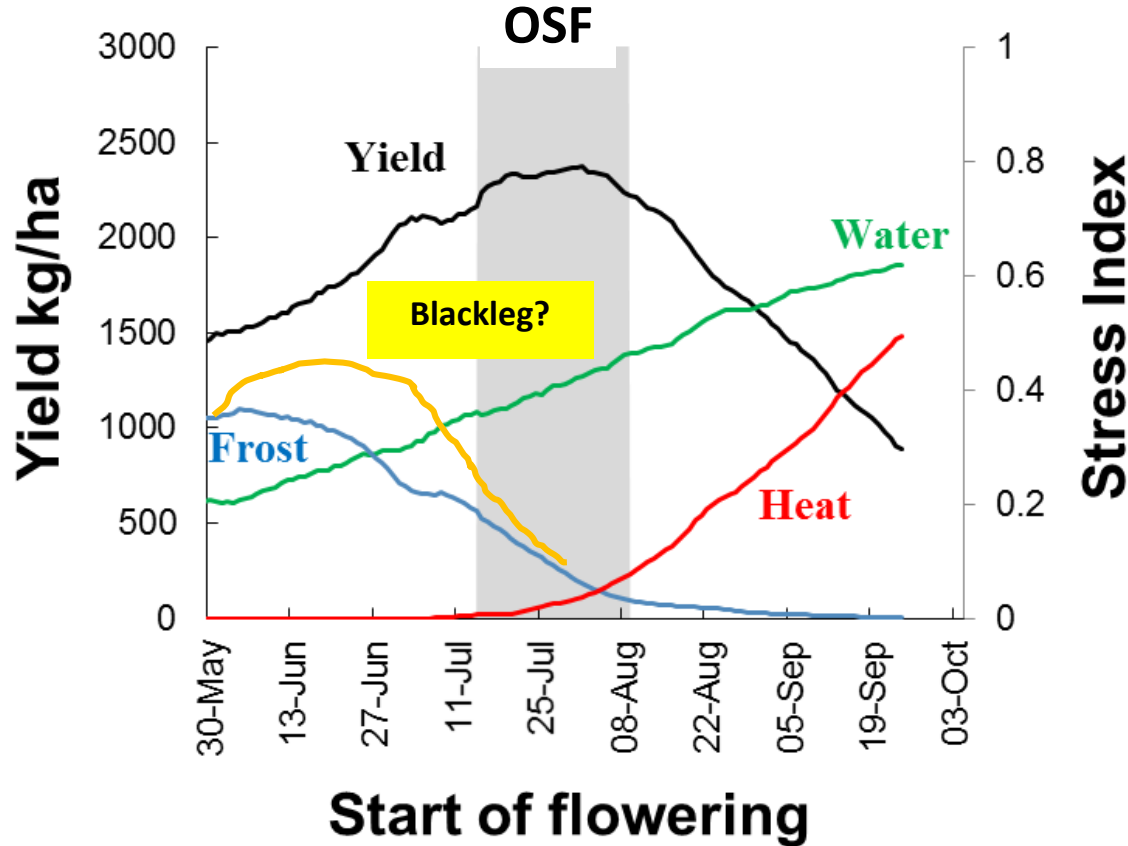


Blackleg Upper Canopy Infection Disease – yield – environment relationships

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Optimal Start of Flowering (OSF)



Optimised
Canola
Profitability
Project



Lilley et al. 2017



NSW: 2016 - 18



Department
of Industry



Optimised Canola Profitability Project

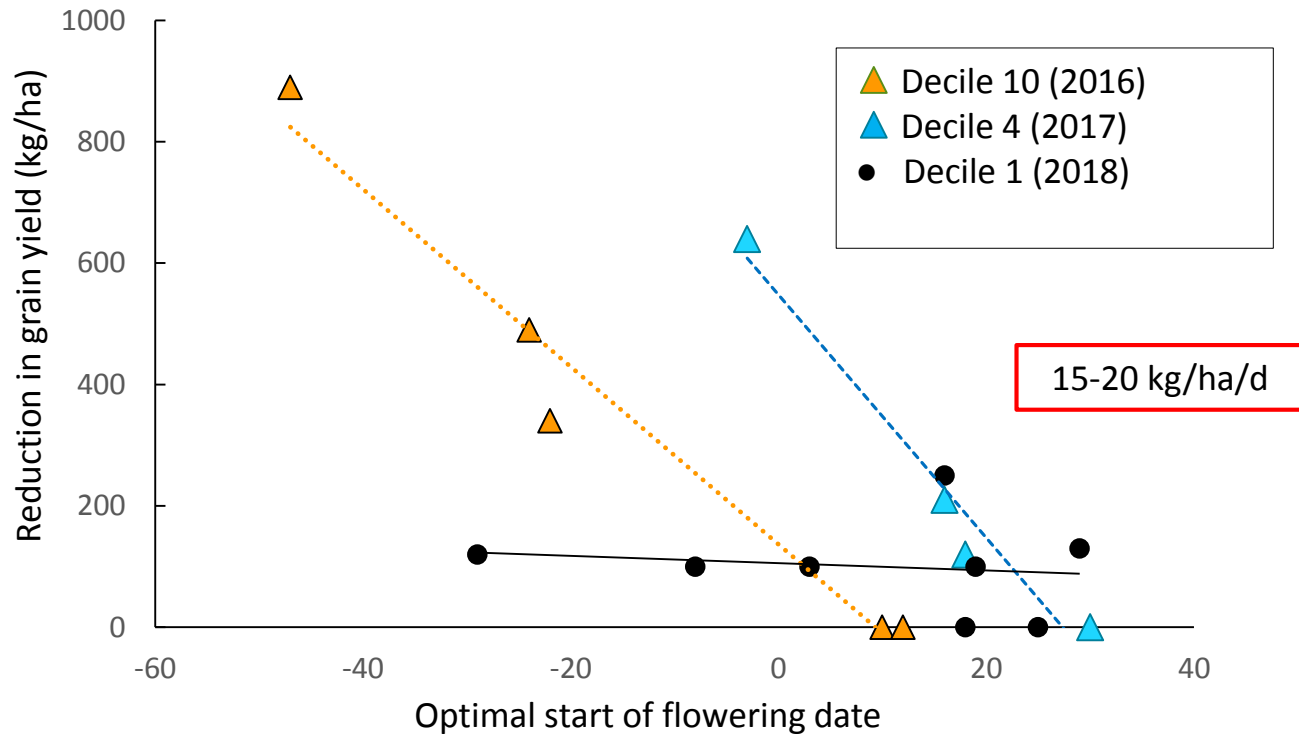
Early April

Mid-April

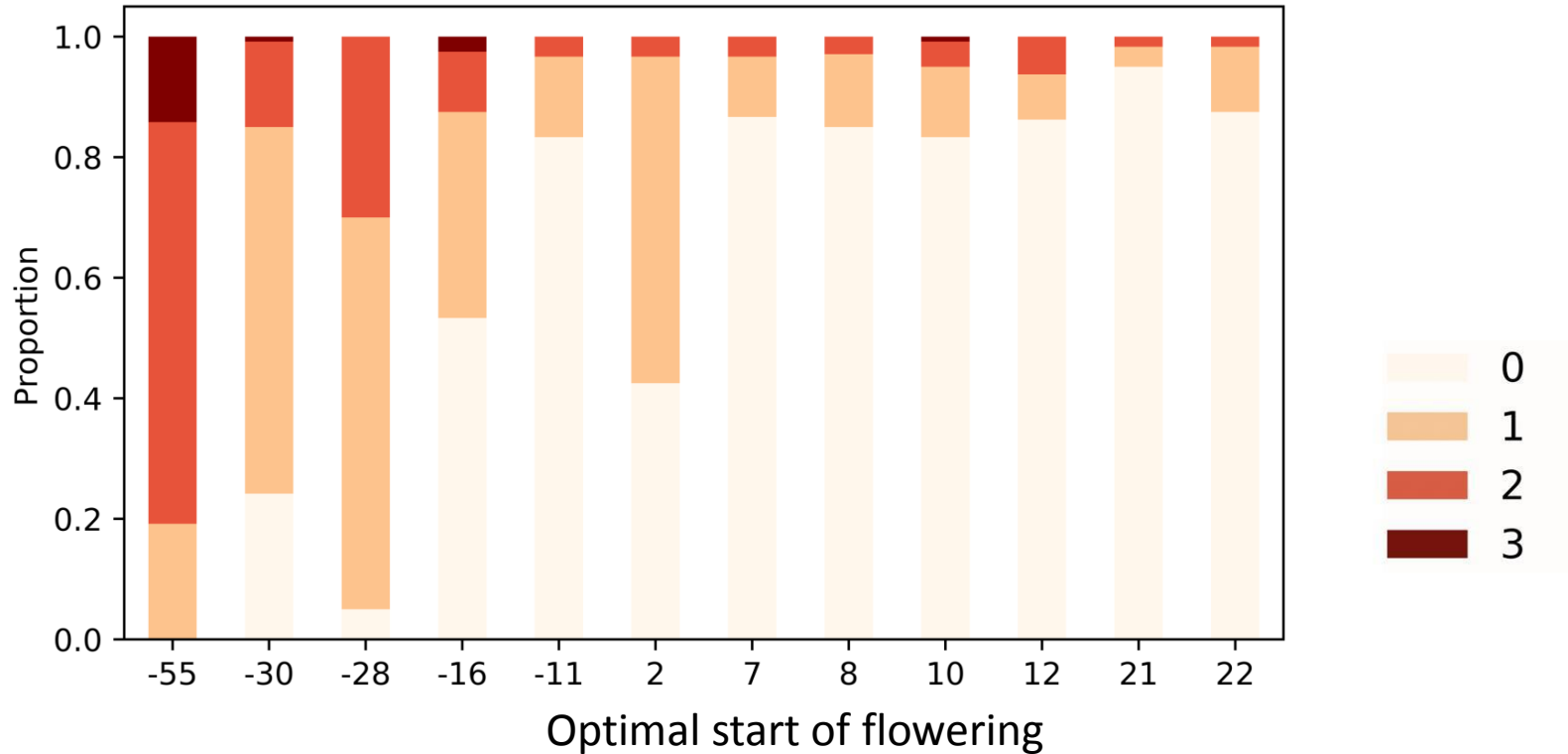
Late April



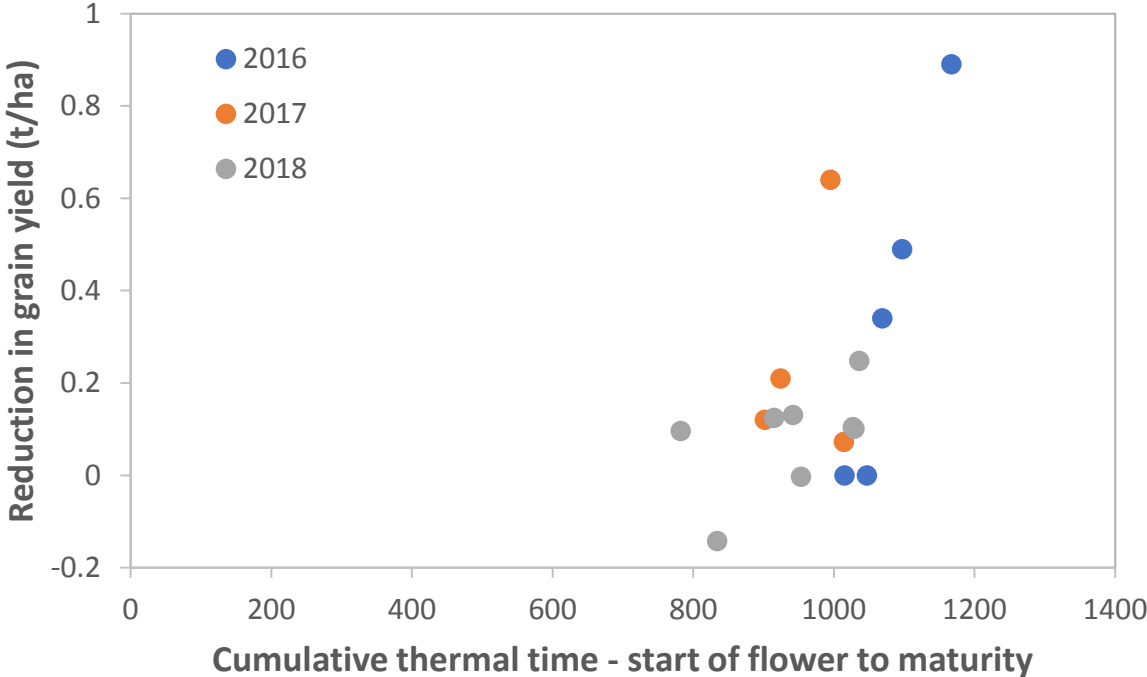
Earlier flowering = increased yield loss



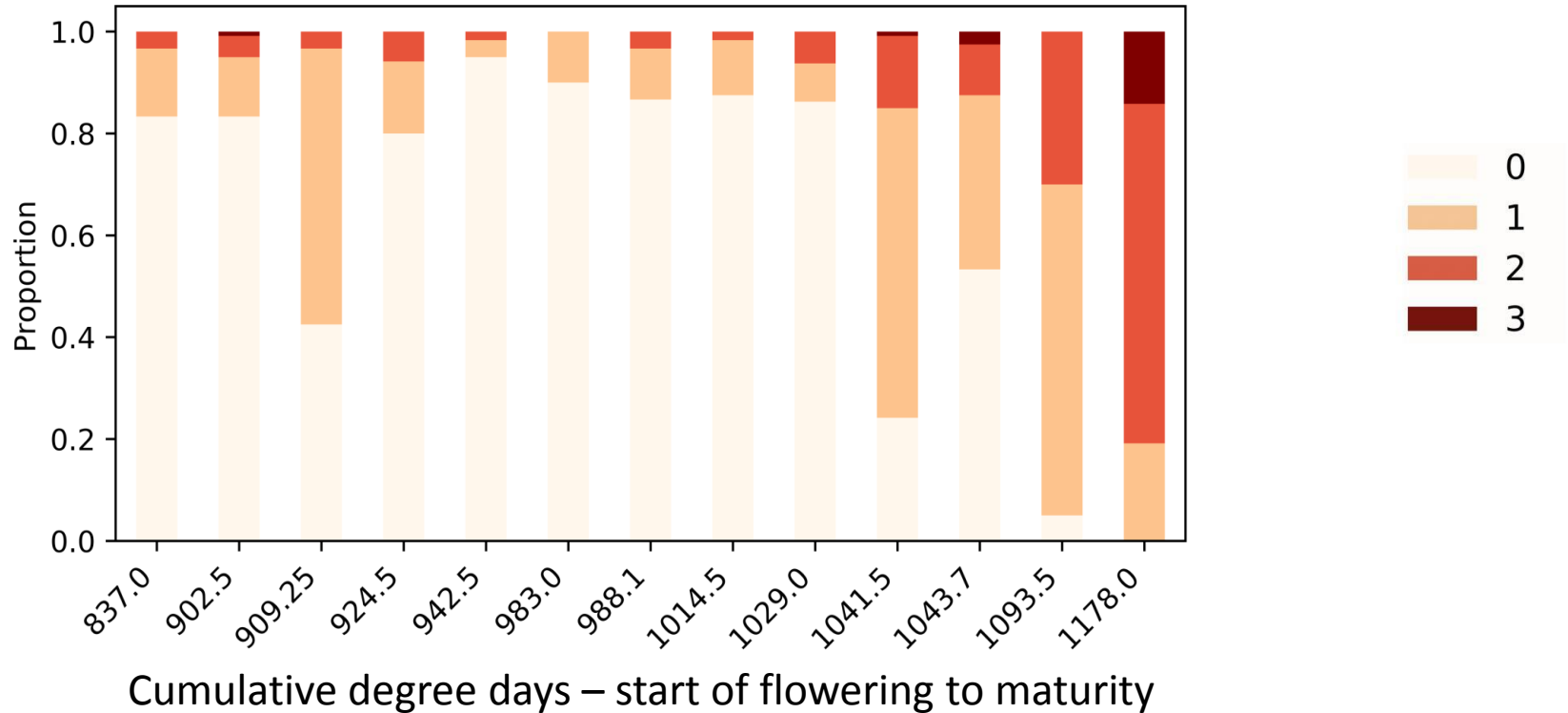
Earlier flowering = more severe UCI



Thermal time



Earlier flowering = more fungal development





6 November



15 November

Fungal development on yield formation

Stingray in bordered pots – 6 reps of 20 plants (2018 & 19)

Inoculated at different time points

Inoculated on different plant parts

- base of main raceme
- first branch
- pods

Disease measurement – length of internal infection

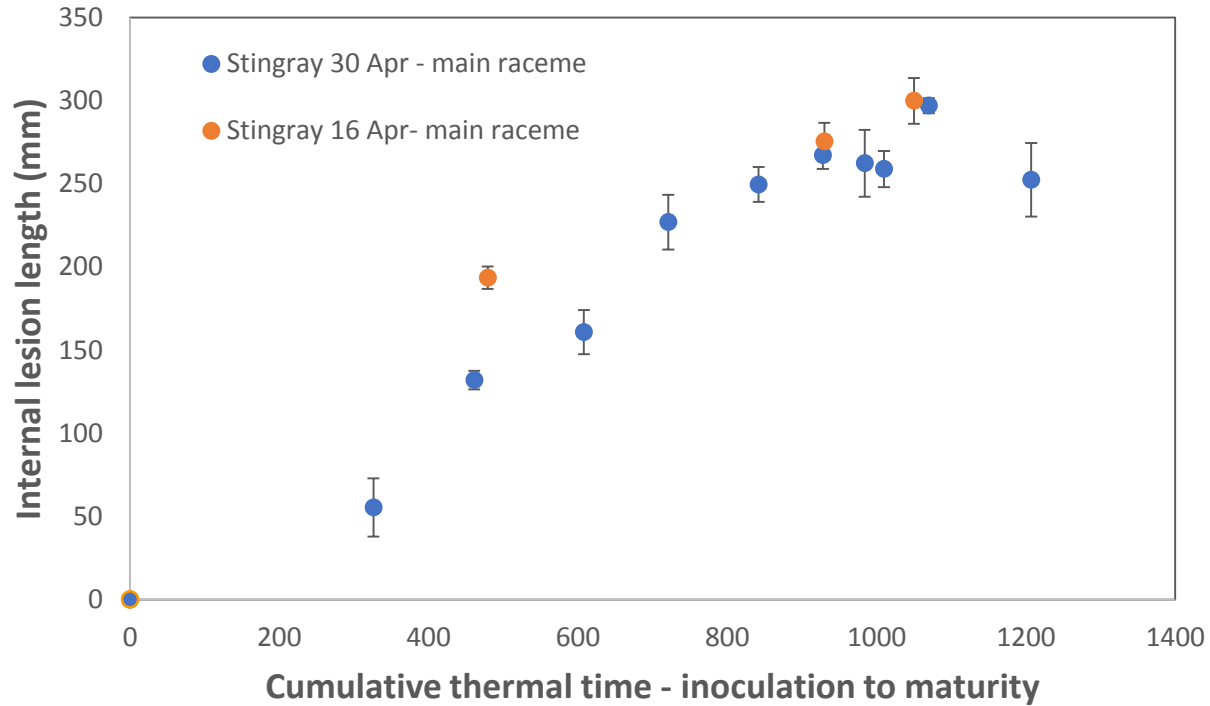
Detailed yield components (biomass, seeds/pod, pods/plant, seed size)

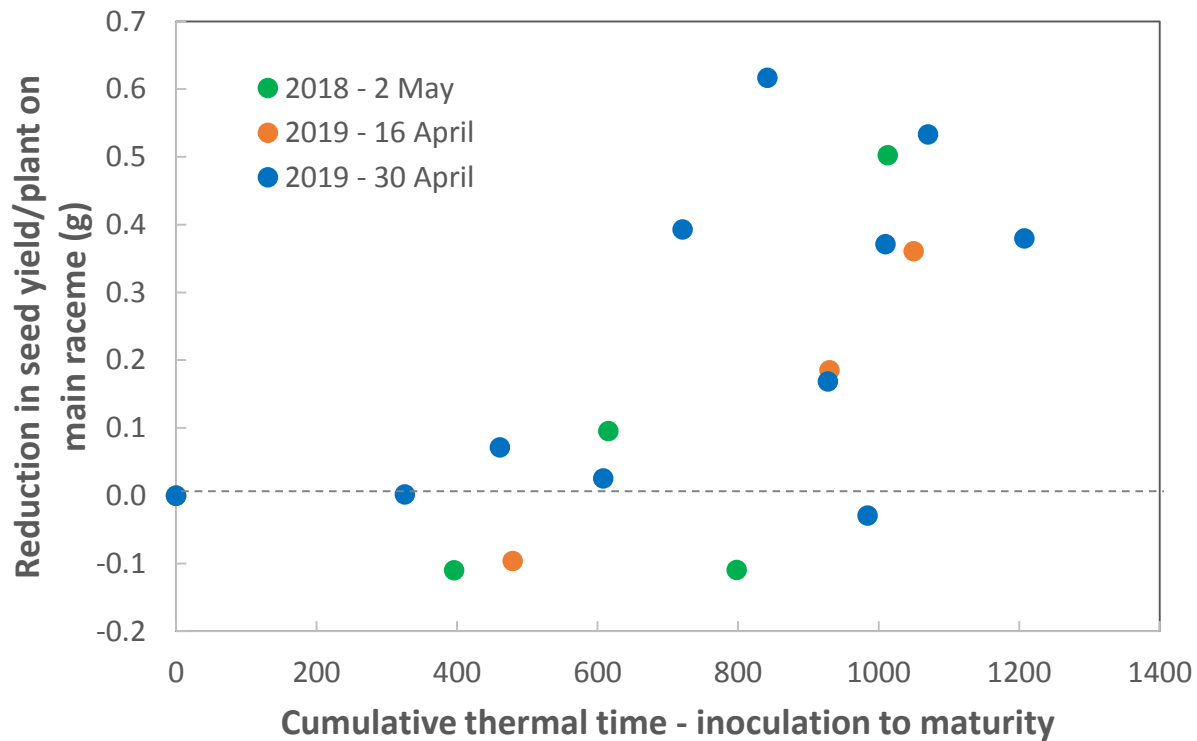


Inoculation timings – thermal time

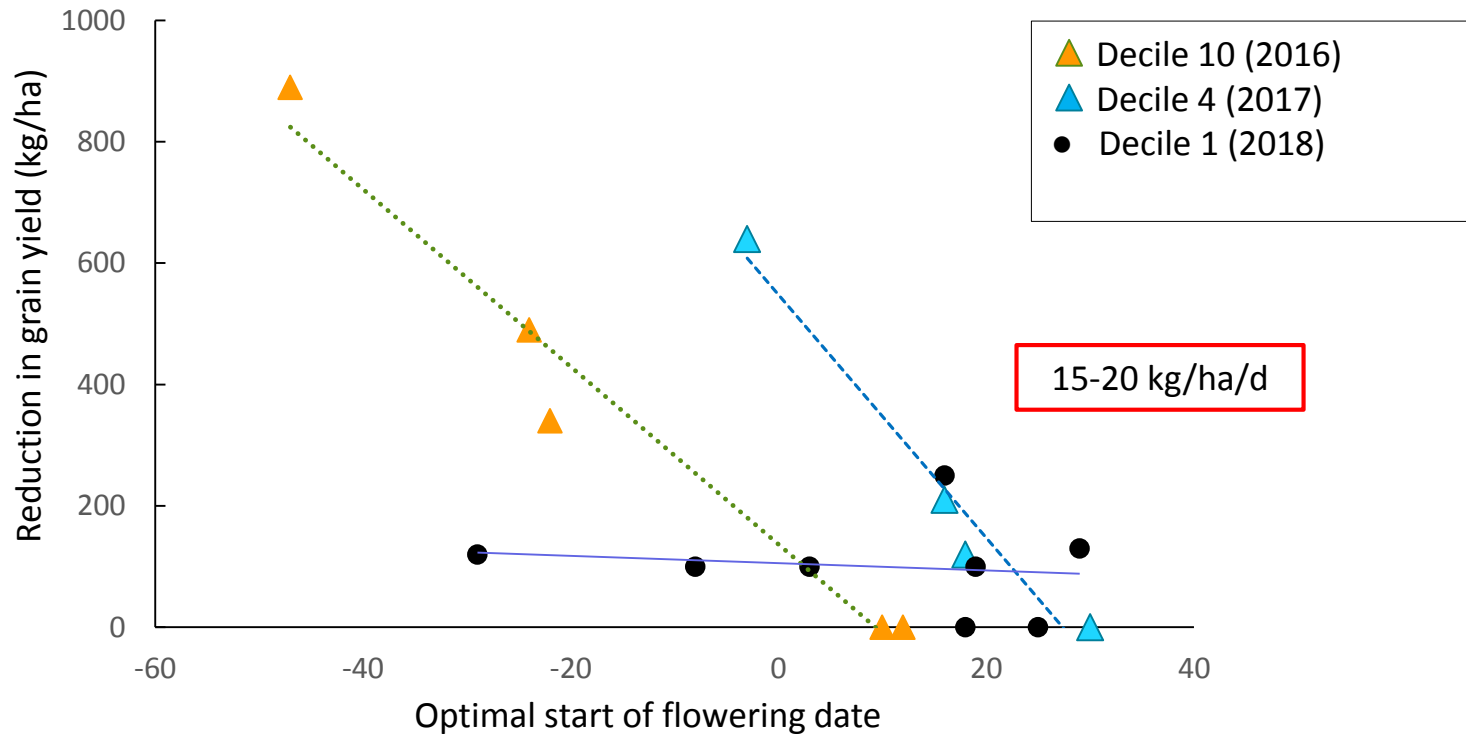
	2018	2019	
	2-May	16-Apr	30-Apr
Uninoculated	x	x	x
20cm elongated			1207
start of flowering			1070
start of flowering + 50GDD (~30% bloom)	1013	1050	1010
start of flowering + 100GDD			984
start of flowering + 150GDD			928
start of flowering + 250GDD	798	930	842
start of flowering + 400GDD	615		721
start of flowering + 550GDD			608
start of flowering + 700GDD	396	479	461
start of flowering + 850GDD			326

Disease severity

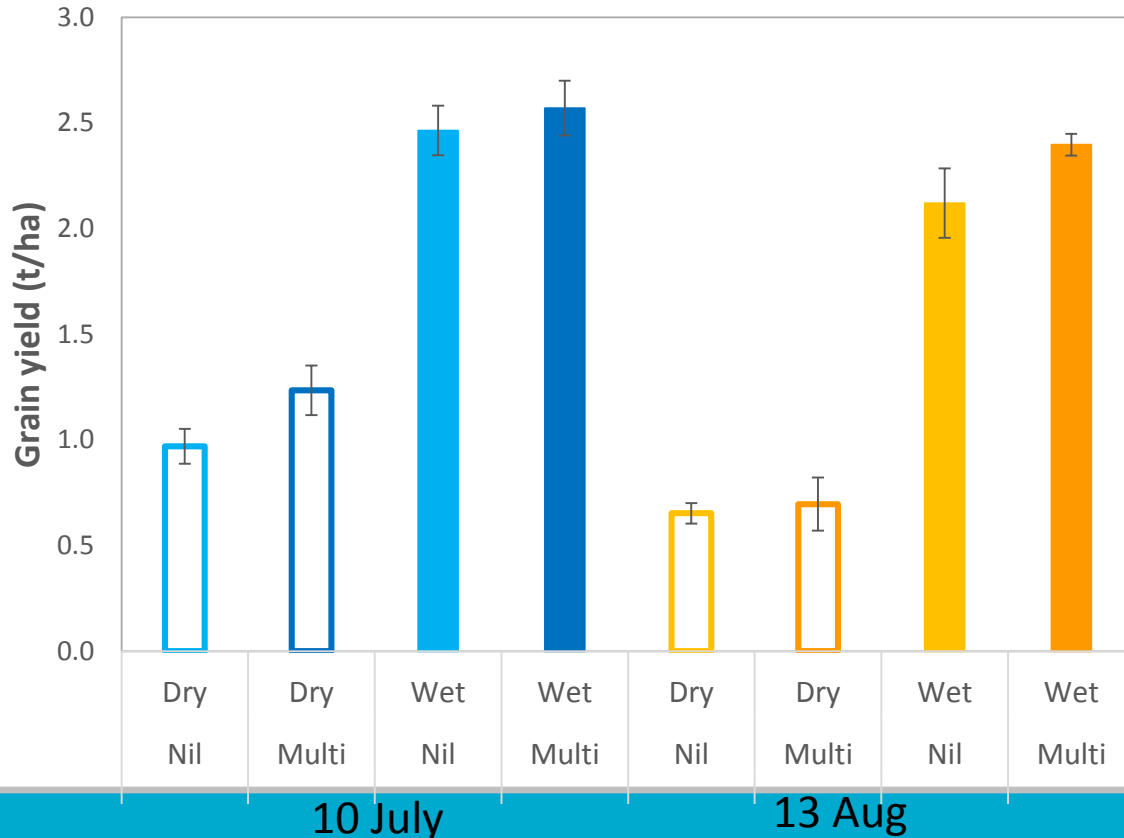




Earlier flowering = increased yield loss



Late season water stress & UCI

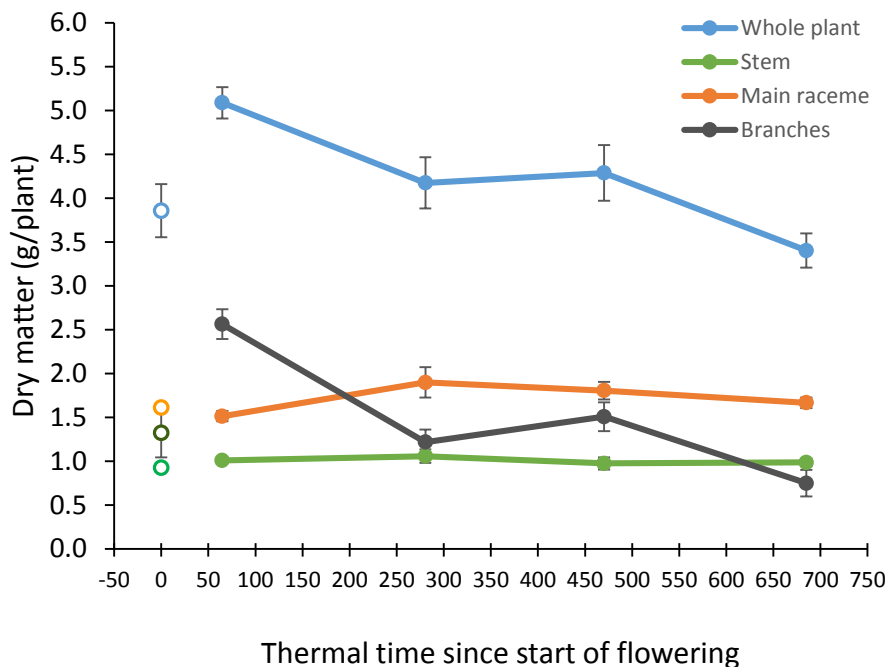


Wagga Wagga 2019

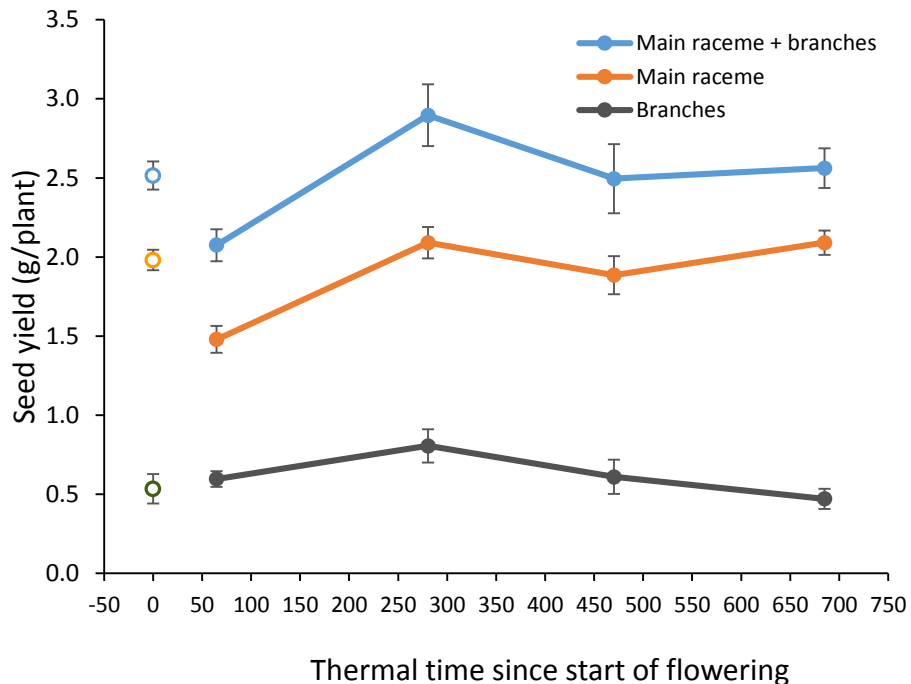
Conclusions

- UCI symptomology extremely variable = difficult to assess
- Broad disease severity : yield loss relationship
- Earlier infection of crop critical but doesn't always reduce yield
- Other factors – plant stress, ??
- Important for management decisions

Dry matter (g/plant)

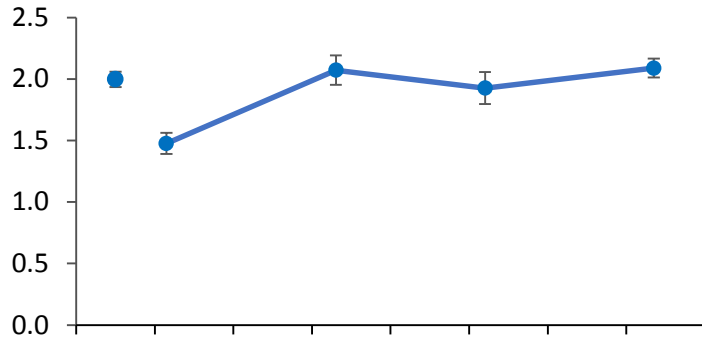


Seed yield (g/plant)

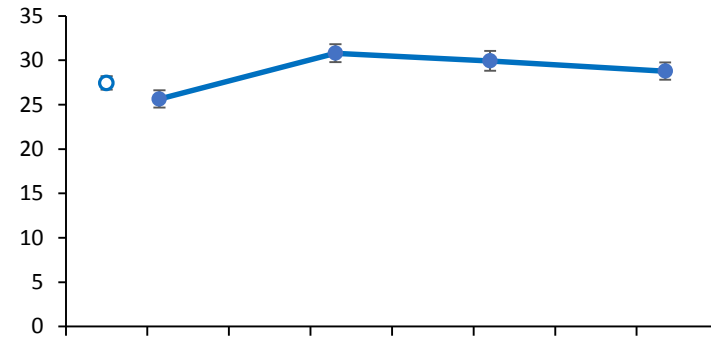


Yield components: main raceme

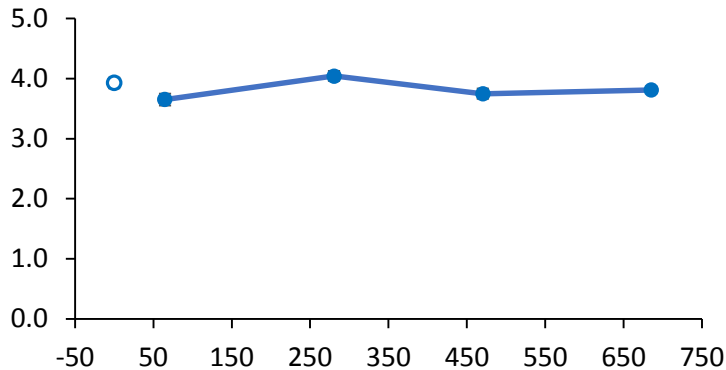
Seed yield of main raceme/plant (g)



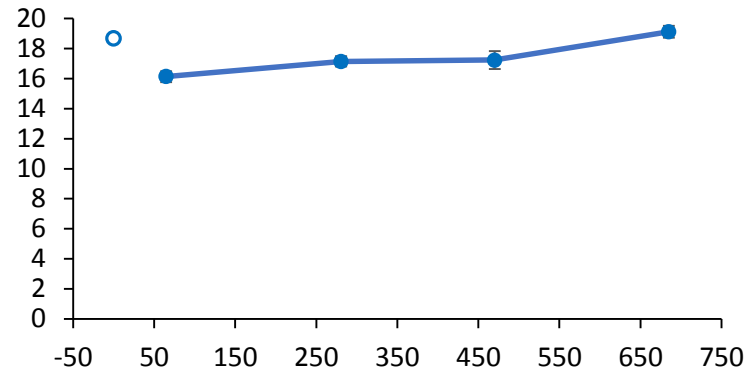
Pods on main raceme/plant



1000 Seed Weight (g)

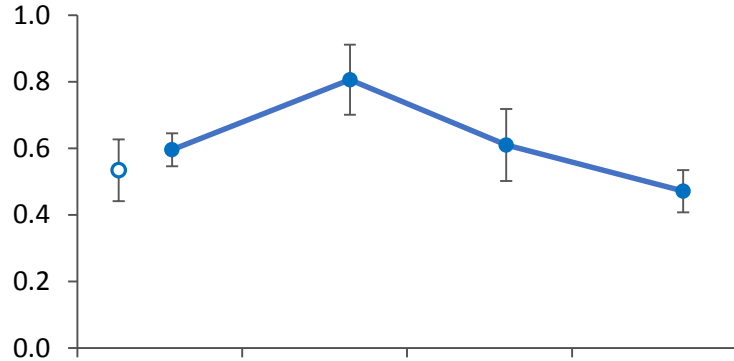


Seeds/pod

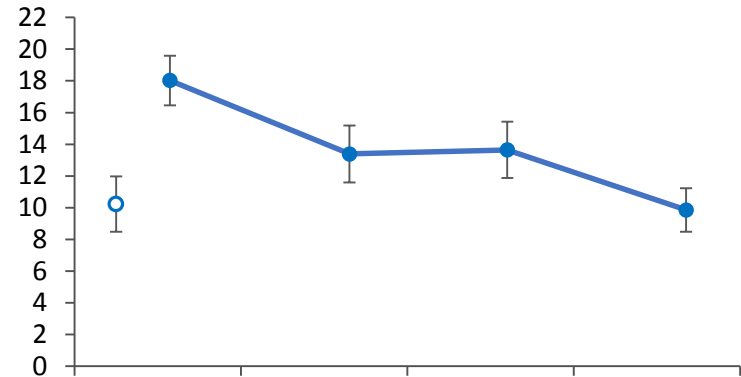


Yield components: branches

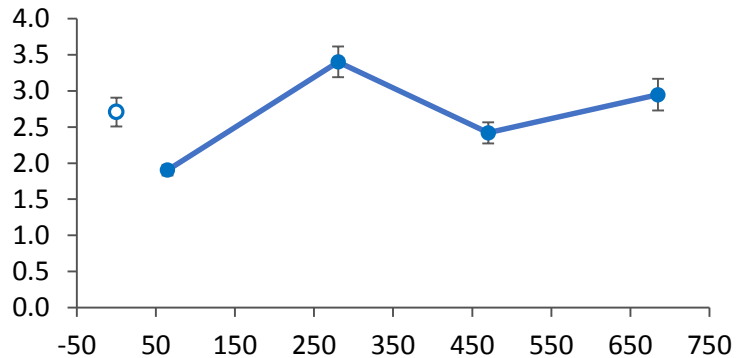
Seed yield of branches/plant (g)



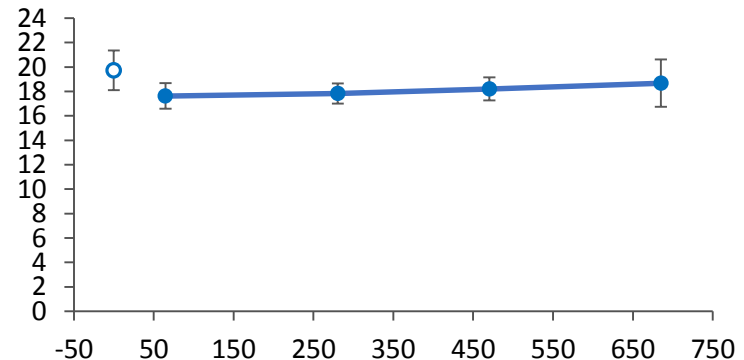
Pods on branches/plant



1000 seed weight (g)



Seeds/pod



The Knowns

- Blackleg upper canopy infection causes significant yield loss
- Effective major gene resistance controls UCI
 - Ineffective major gene = complete susceptibility
- Delayed flowering until later in optimal period reduces risk in high disease areas
- Infection during early flowering leads to greatest yield reductions
 - Late pod infection also (no control options – MRLs)
- No chemicals registered for blackleg UCI
 - Application at 30% bloom for sclerotinia stem rot may provide protection in high disease risk areas

The Unknowns

- Lack predictive capacity
- Genetics – QR? Crop type? Physiological characteristics?
- Infection pathway - where/when/how/what effect?
- Relationship with plant stress/physical damage (frost, hail, insect, etc)?
- Symptom expression – how/when is it best to measure? Is it related to development stage?
- What are the underlying changes in system to increase prevalence of UCI?