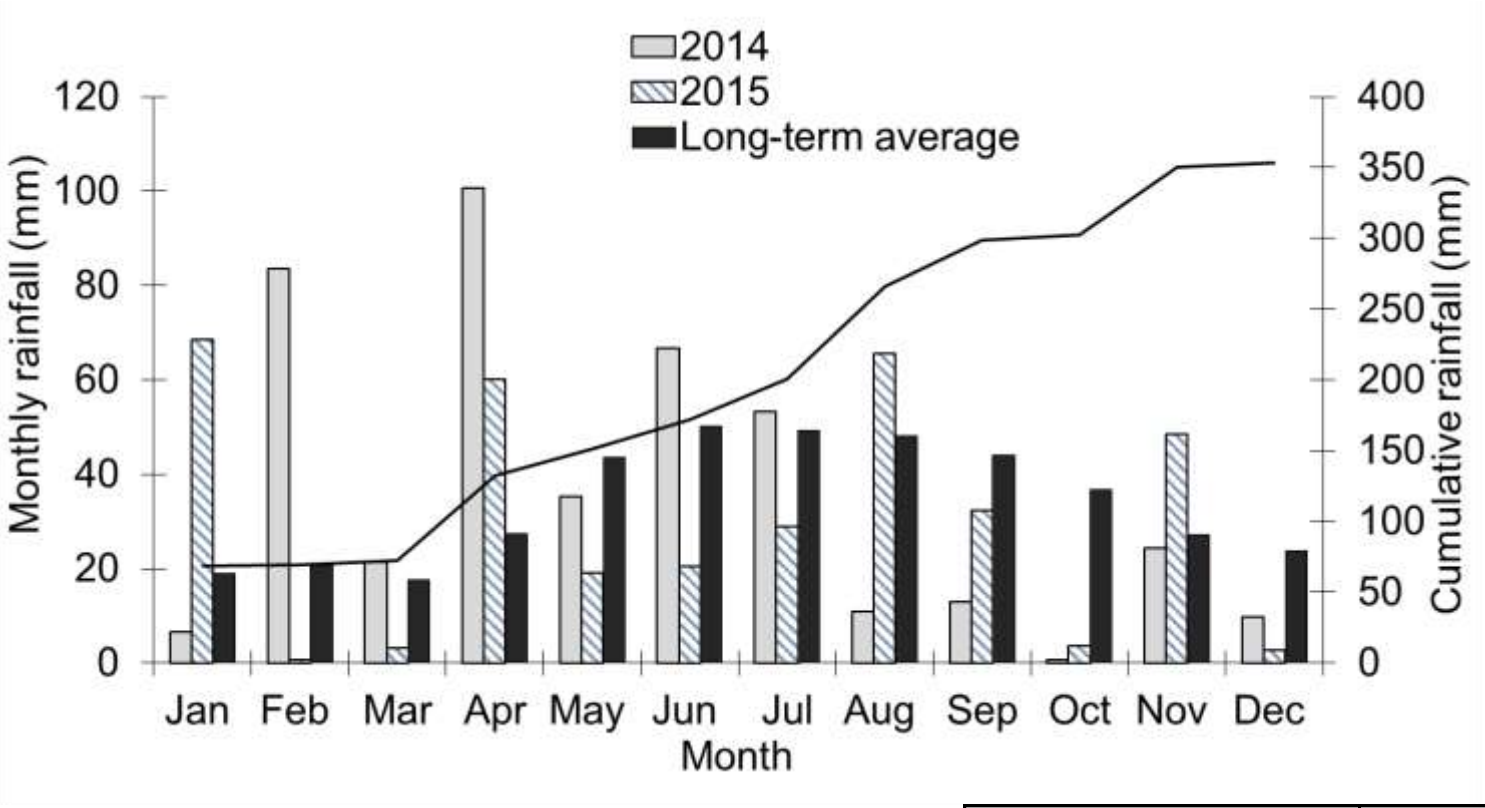
Trial results from 2015

Sarah Noack, Hart Field-Site Group

The 2015 season at Hart



	Total annual rainfall (mm)	Growing season (mm)
Long-term average	400	305
2013	377	303
2014	426	280
2015	353	230

- Three years of stubble management trials
  - Narrow windrow burning
  - Wheat time of sowing

- Snapshot of the other trials from 2015

Stubble systems investigated

Why do the trials?

The combination of a stripper front harvester/ disc seeder

- Does this system give higher yields?
- Observations of poor early crop vigour
- Options for safe and effective herbicide use

Use of stubble to improve the harvestability of certain pulse crops

Over past three seasons we have consistently worked with the same four stubble treatments.

- Baled (< 5 cm)
- Short (15 cm)
- Medium (30 cm)
- Stripper front (70-80 cm)

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What does this look like in the field?

Stubble management: Lentils

How was it done?

Location	Stubble height	Stubble type	Lentil variety	Seeding system
2013 Hart	Baled	Wheat	Blitz	Disc
	Short			
	Medium			
	Stripper front			
2014 Pinery	Baled	Barley	Jumbo	Disc
	Short			
	Medium			
	Stripper front			

- All stubble treatments imposed at harvest and managed identically by the grower.

Stubble management: Lentil crop growth

	Establishment (plants/m^2)		Early plant height (cm)
	2013	2014	2014
Baled	110	76	4.9^{c}
Short	96	71	5.8^{c}
Medium	100	76	7.8^{b}
Stripper front	86	76	9.6^{a}
LSD (P≤0.05)	ns	ns	1.4

- Stubble height had no effect on plant establishment.
- Early plant height was higher however, these plants had a very thin structure.

Stubble management: Lentil crop growth

- Plant and pod height from the soil surface were highest for >15 cm stubble.
- Stubble type (2013- wheat, 2014 – barley)
- Differences in lentil variety plant architecture (Lines *et al.* 2013)

Stubble management: Lentil crop growth

	2013	2014
Stubble treatment	Grain yield t/ha	
Baled	2.2	1.7
Short	2.6	1.8
Medium	2.8	1.8
Stripper front	2.7	1.8
LSD (P≤0.05)	ns	ns

- Stubble height did not drive a yield response in either season.
- Yield gains up to 30% in other research (Lines et al. 2013), particularly at later times of sowing.

Key messages

- Variety selection – what is the particular growth habit of your variety?
- If stubble can improve management think about rotation position (stubble type).

What else did we learn?

- Over three seasons we have not measured differences in stored moisture over summer under different stubble heights (short term?).
- We were able to measure reduction in wind speed and variations in surface soil temperature throughout all seasons of trials.
- Disease or pest issues were similar across all stubble treatment (seasonal).
- Despite differences in crop growth and microclimate these did not translate to grain yield differences (lentils, wheat or barley).

Where to from here?

- Spray applications and how they are affected by stubble height.

Harvest weed seed control – Narrow windrow burning

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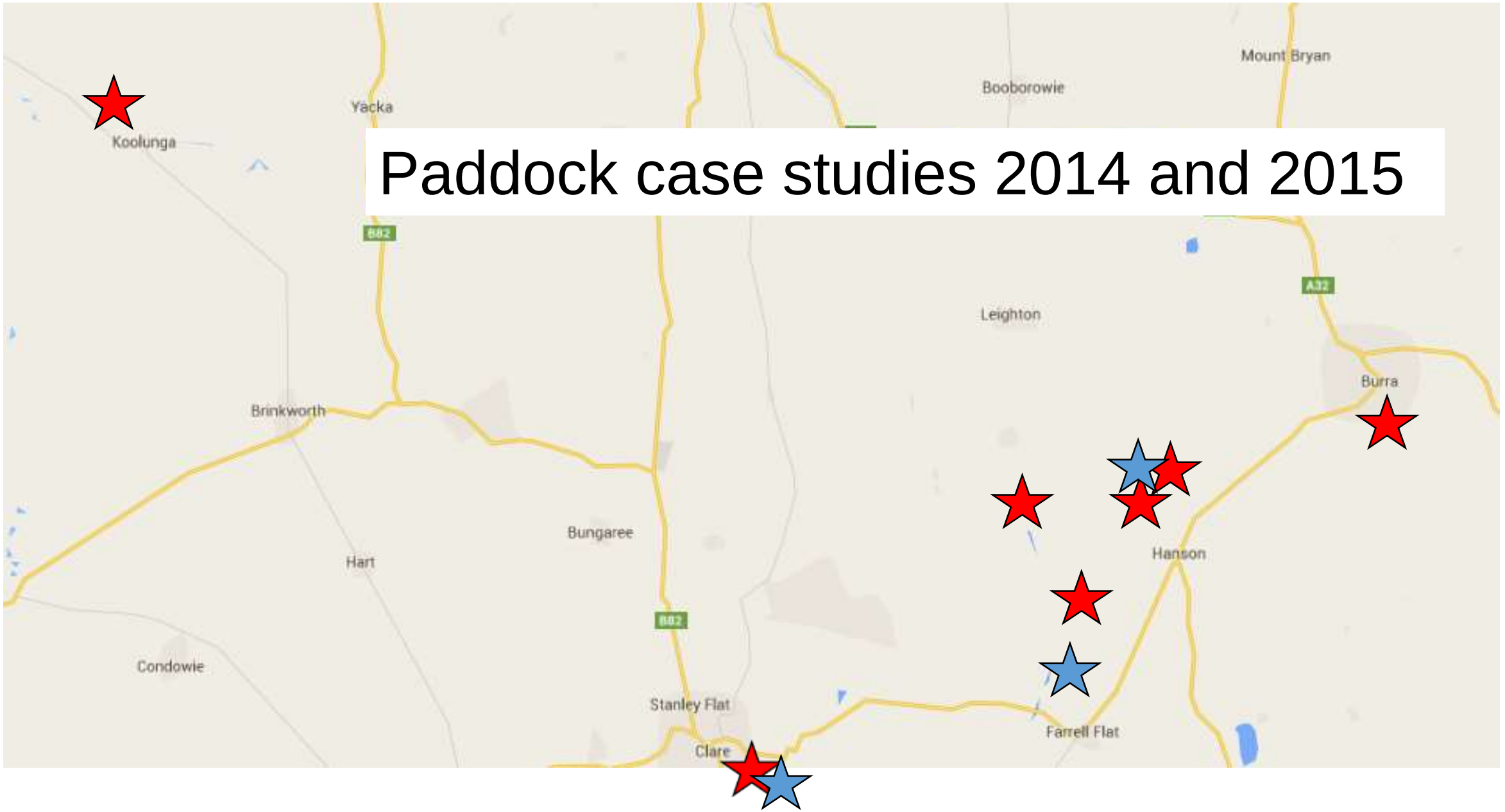
Harvest weed seed control: Narrow windrow burning

Why do the trials?

- Non-chemical weed control strategy.
- Weed seed kills of up to 99% for ryegrass and wild radish.
- Simple and low cost method resulting in widespread adoption in WA (~70%) and increasingly used in SA.
- Last season I presented case studies of >90% control of ryegrass however, we know that is not always the result.
- This season we expanded the case studies to include
    - Canola and wheat paddocks
    - Burnt windrow edge vs. centre

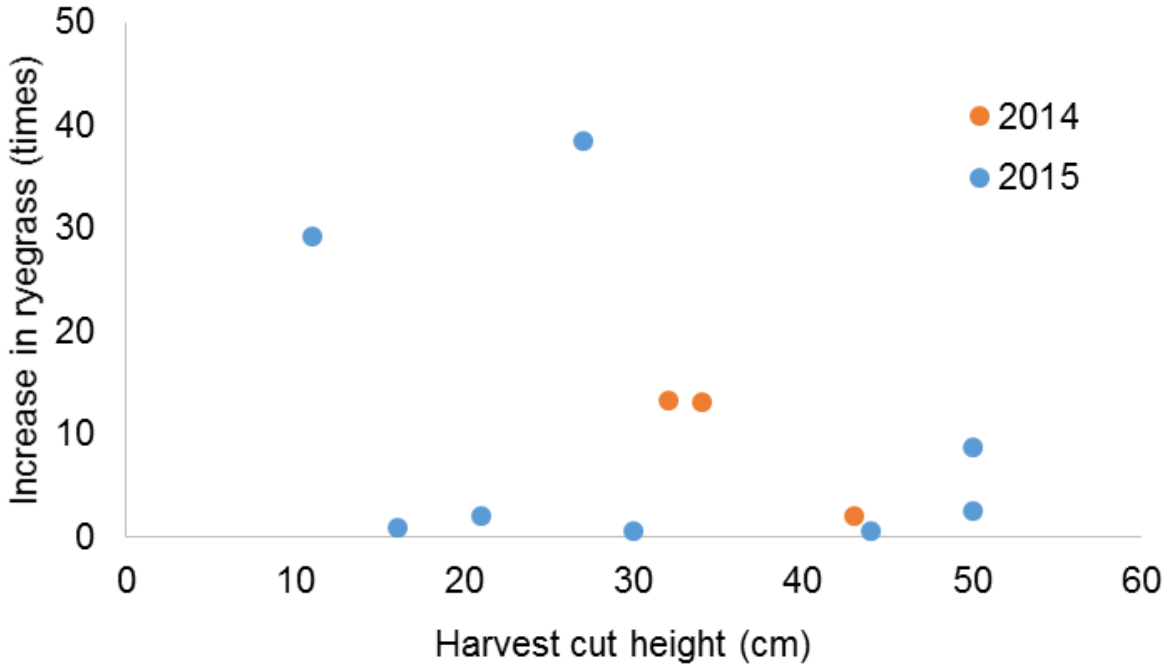
Paddock case studies 2014 and 2015



Harvest weed seed control: Sampling

Ryegrass capture at harvest

Increase in ryegrass compared to the inter windrow



- Not all paddocks were effective at increasing the concentration of ryegrass in the windrow.
- It was not as straight forward as cut low = higher capture.
- Height and maturity of the ryegrass is important to use this technique well.

Narrow windrow burning: The numbers

Crop phase (Site)		Windrow treatment
		Unburnt
		ryegras
Canola		
	NWB_01	546
	NWB_02	857
	NWB_03	1344
	NWB_06	36225
	NWB_07	63274
Wheat		
	NWB_04	63227
	NWB_05	9041

- Variable ryegrass control in 2015 from 37-93%.
- Cereal paddock burns were as effective as canola in the centre of the windrow.
- In general ryegrass control on edge of windrow was similar to the centre.

Burn conditions/timing

- Generally poorer control occurred where growers had waited for fire ban to end and burnt in early May (many districts received >20 mm rainfall).
- There was insufficient time for the windrow to dry before seeding and these moist conditions = poorer quality burns.

Narrow windrow burning: Key findings

- Narrow windrow burning can be an effective tactic against ryegrass provided
    1) weed seeds are captured and concentrated at swathing & harvest
    2) the burn heat and duration are enough to kill weed seeds.
- Annual ryegrass control in canola was more variable than last season with 37-86% control of the seed captured and concentration in the windrow.
- Good ryegrass control was achieved for wheat residues.

Wheat time of sowing

Wheat time of sowing: 2015 varieties

Variety	Maturity
Emu Rock	Very fast maturing spring (weak vernalisation, weak photoperiod)
Cobra	Fast maturing spring (moderate vernalisation, weak photoperiod)
Mace	Fast-maturing spring (moderate vernalisation, weak photoperiod)
Trojan	Mid-fast maturing spring (weak vernalisation, moderate photoperiod)
EGA_Wedgetail	Mid-maturing winter (strong vernalisation, moderate photoperiod)
DBA-Aurora	Mid-maturing spring durum

Three times of sowing 10th April, 30th April and 15th May.

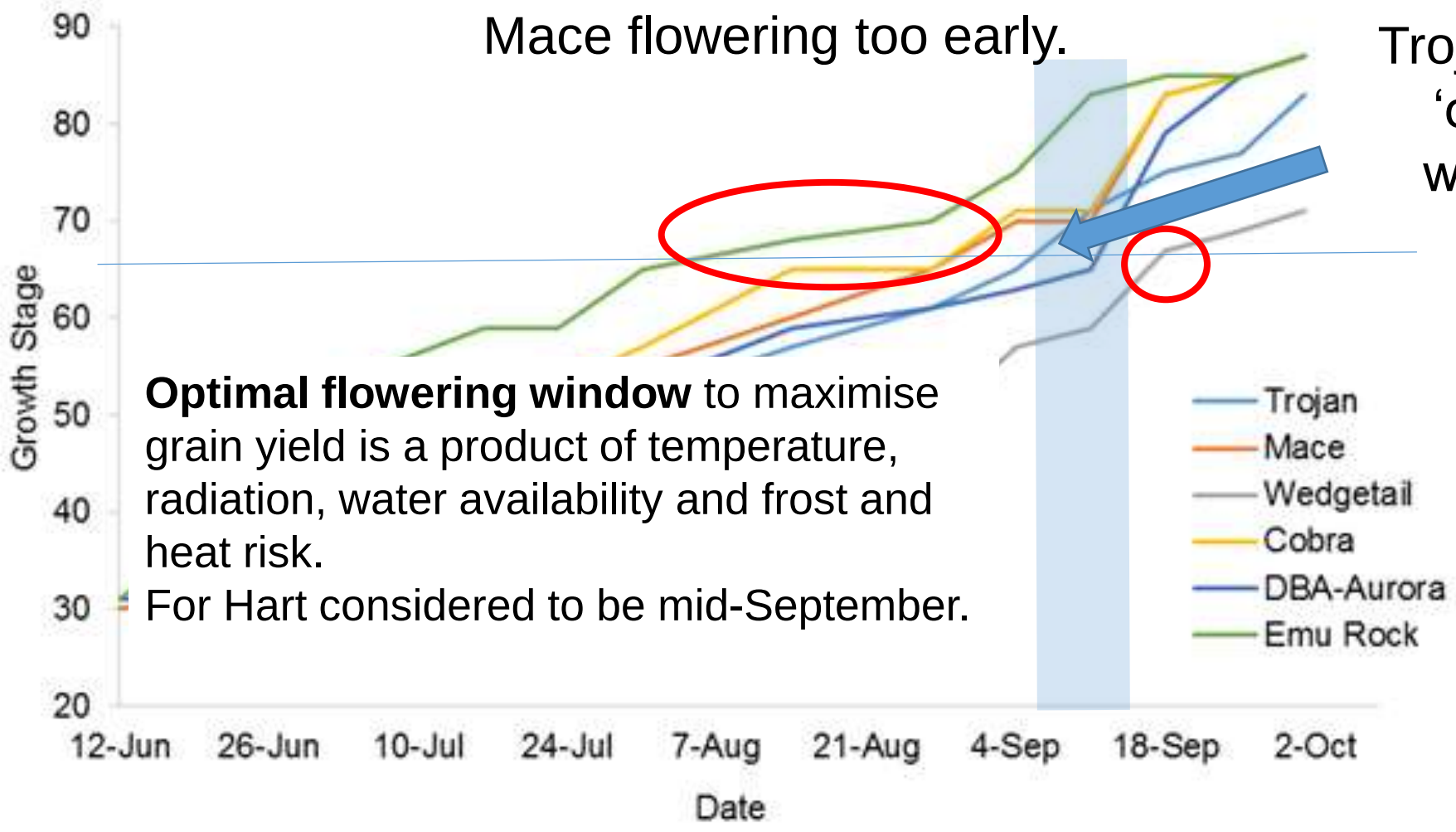
Wheat time of sowing: Grain yield

	Yield (t/ha)		
	10th April	30th April	15th May
Wedgetail	**3.5**		
Trojan	**3.7**		
Mace	2.9		
Emu Rock	3.1		
Cobra	3.2		
DBA-Aurora	*1.6*		
LSD (P≤0.005)	0.3		

Grain quality data can be found in the 2015 trials book, page 22

10th April sowing

Emu Rock, Cobra &
Mace flowering too early.



Trojan in the ‘optimal window’.

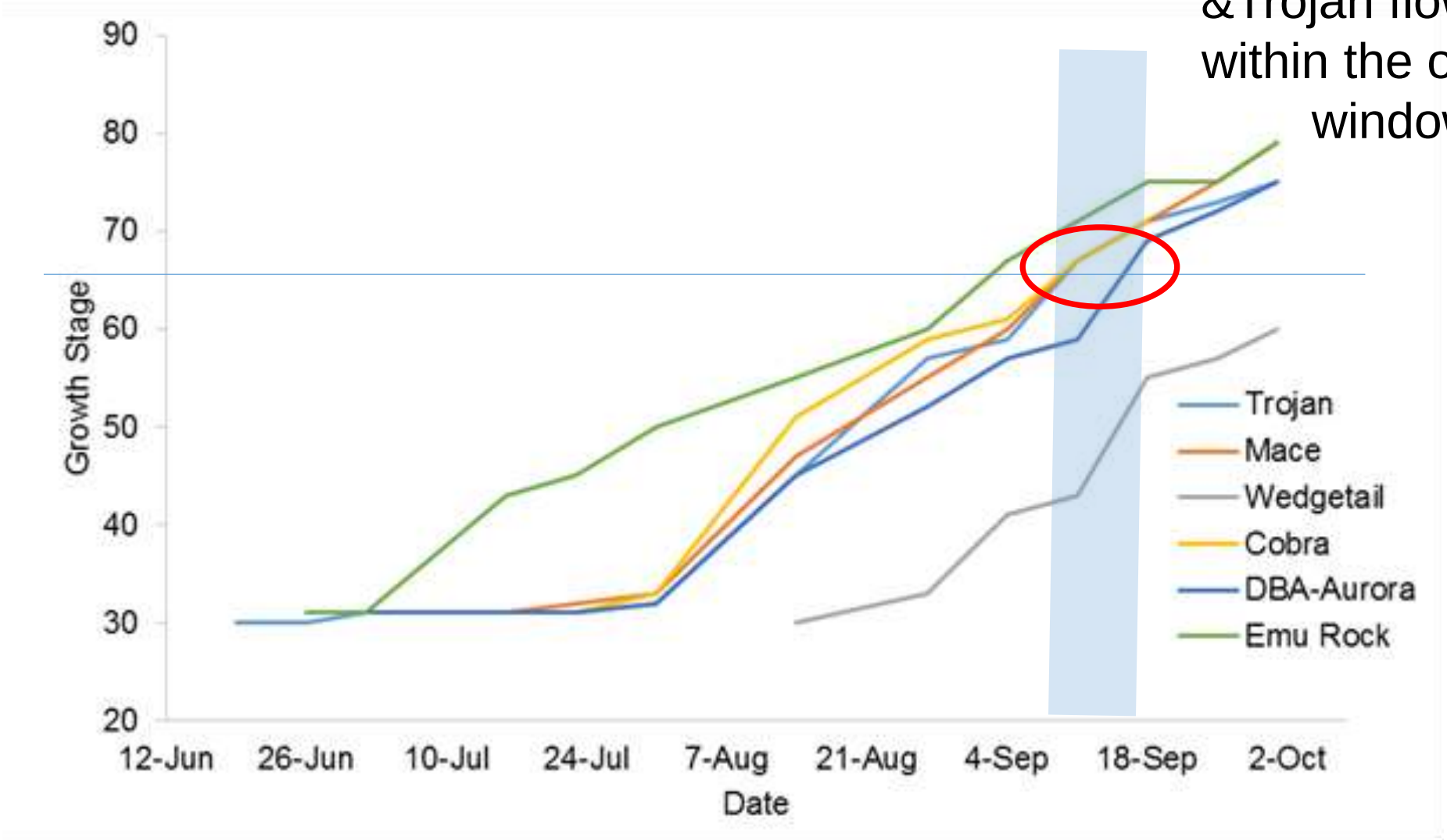
Wedgetail too late

Optimal flowering window to maximise grain yield is a product of temperature, radiation, water availability and frost and heat risk.

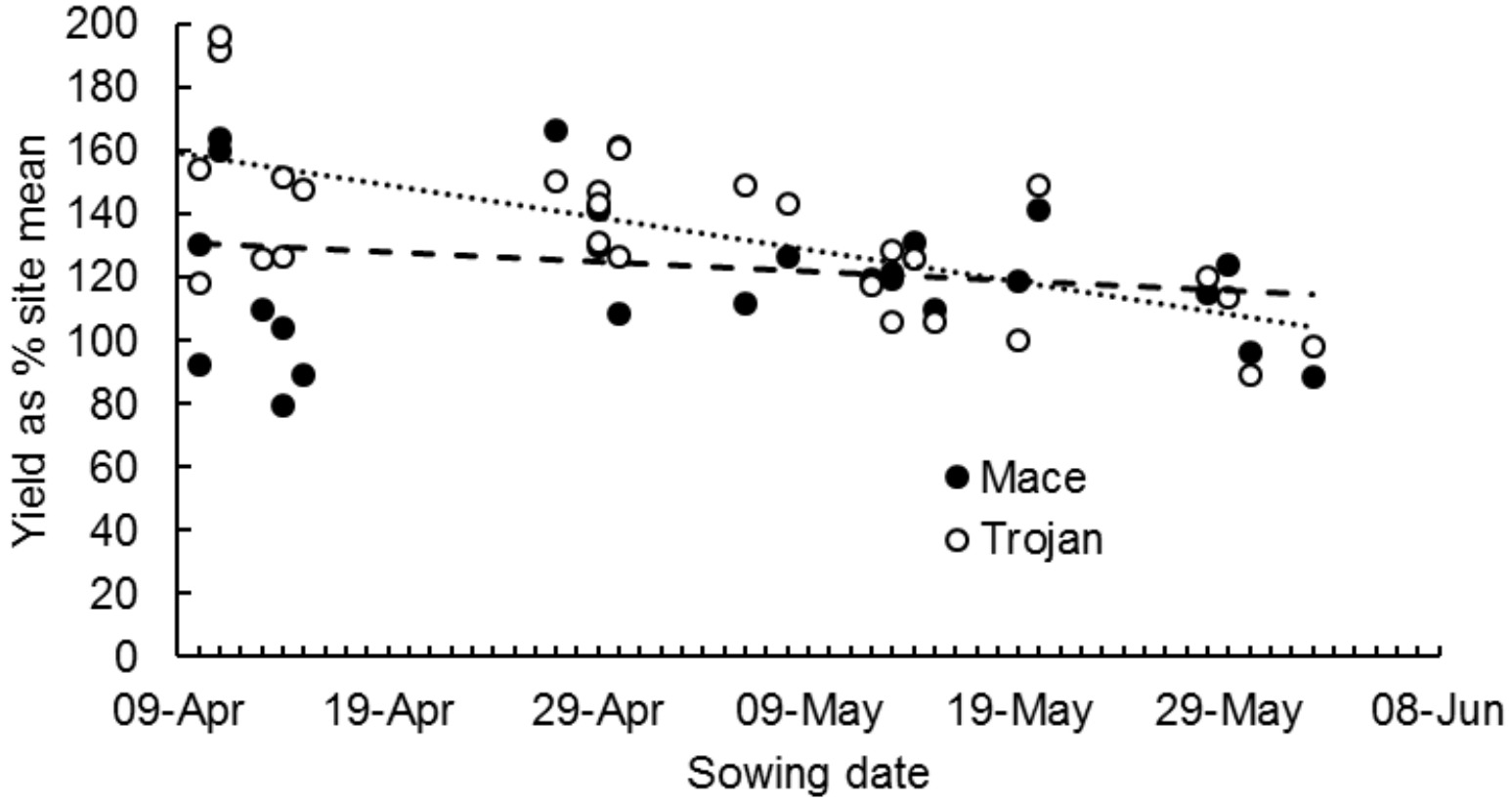
For Hart considered to be mid-September.

30th April sowing

Mace, Cobra &Trojan flowering within the optimal window



Wheat time of sowing: Results across SA



- Grain yield of Mace and Trojan at nine SA sites across 2014 and 2015 seasons at Minnipa, Cummins, Pt Germein, Hart and Tarlee.
- Trojan sown early had a 0.5 t/ha yield advantage over Mace sown at same time.

Wheat time of sowing: Key messages

What have we learnt so far?

- Trojan appears to complement Mace in a cropping program, allowing earlier sowing and achieving higher yield (0.5 t/ha) compared to sowing Mace alone.

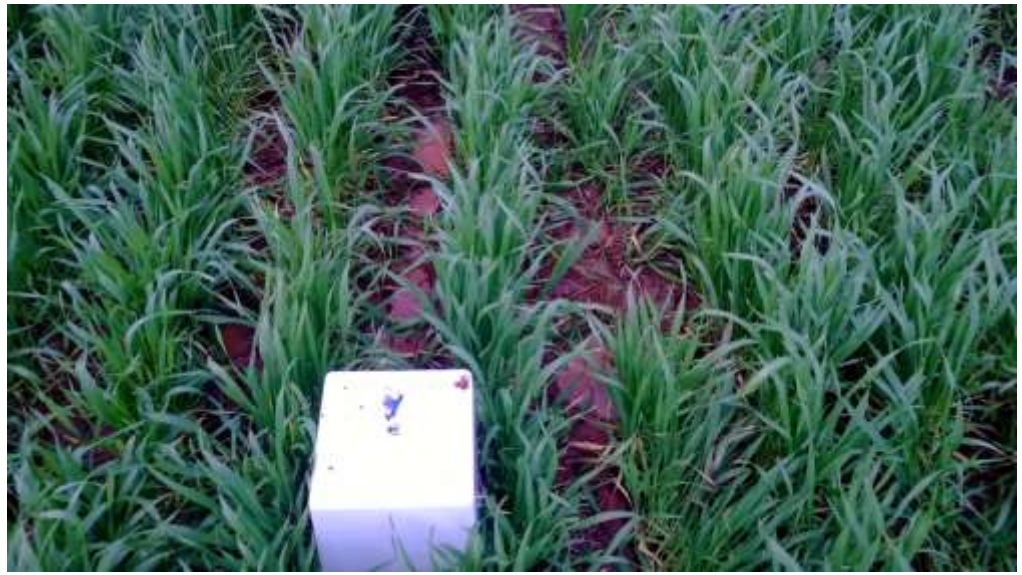
- The results comes from two (similar) seasons and Hart will be running this trial again in 2016.

Deep ripping and placement of nutrients

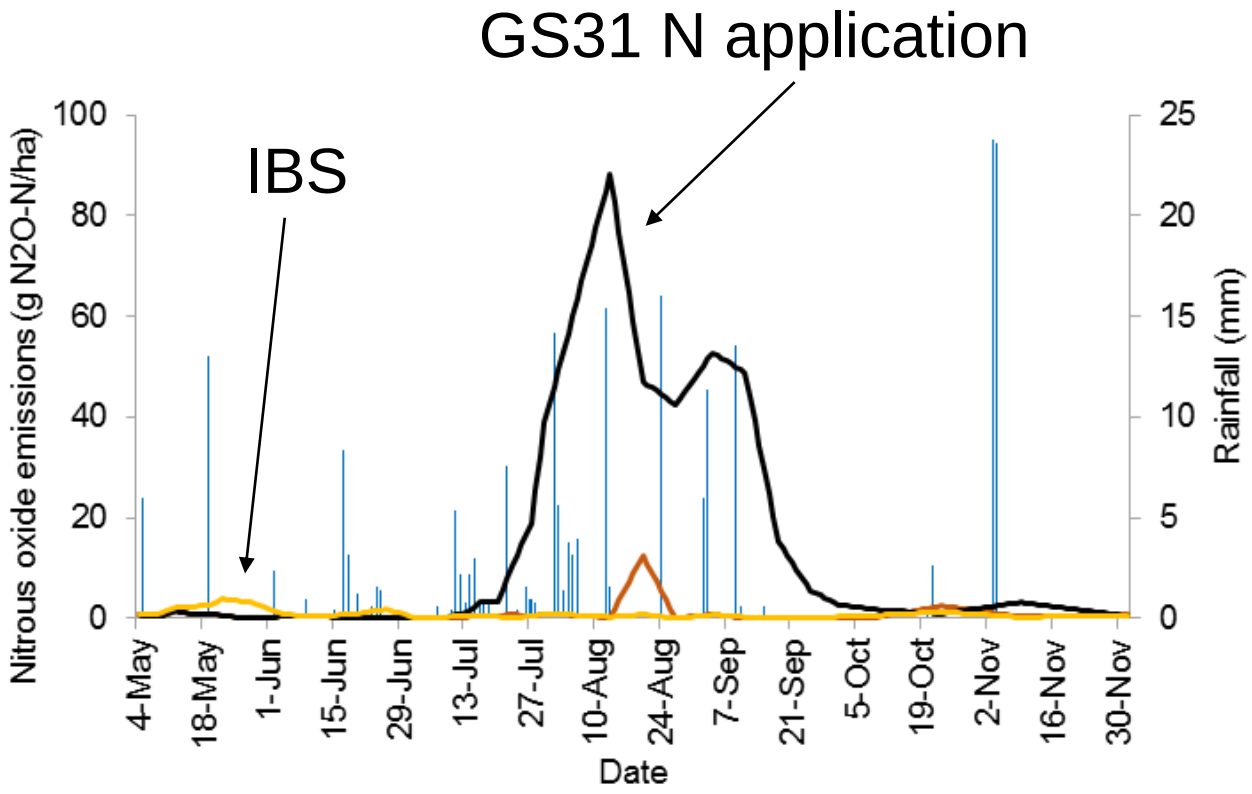
Trengove Consulting

- Subsoil constraints
- Year one of the trials
- Three sites Bute, Clare and Hart
- 20 t/ha chicken litter and matched fertiliser

Nitrogen fertiliser losses as nitrous oxide



- Nitrogen management strategies in wheat to improve productivity and reduce N losses.
- Second season of data, two different outcomes.



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