

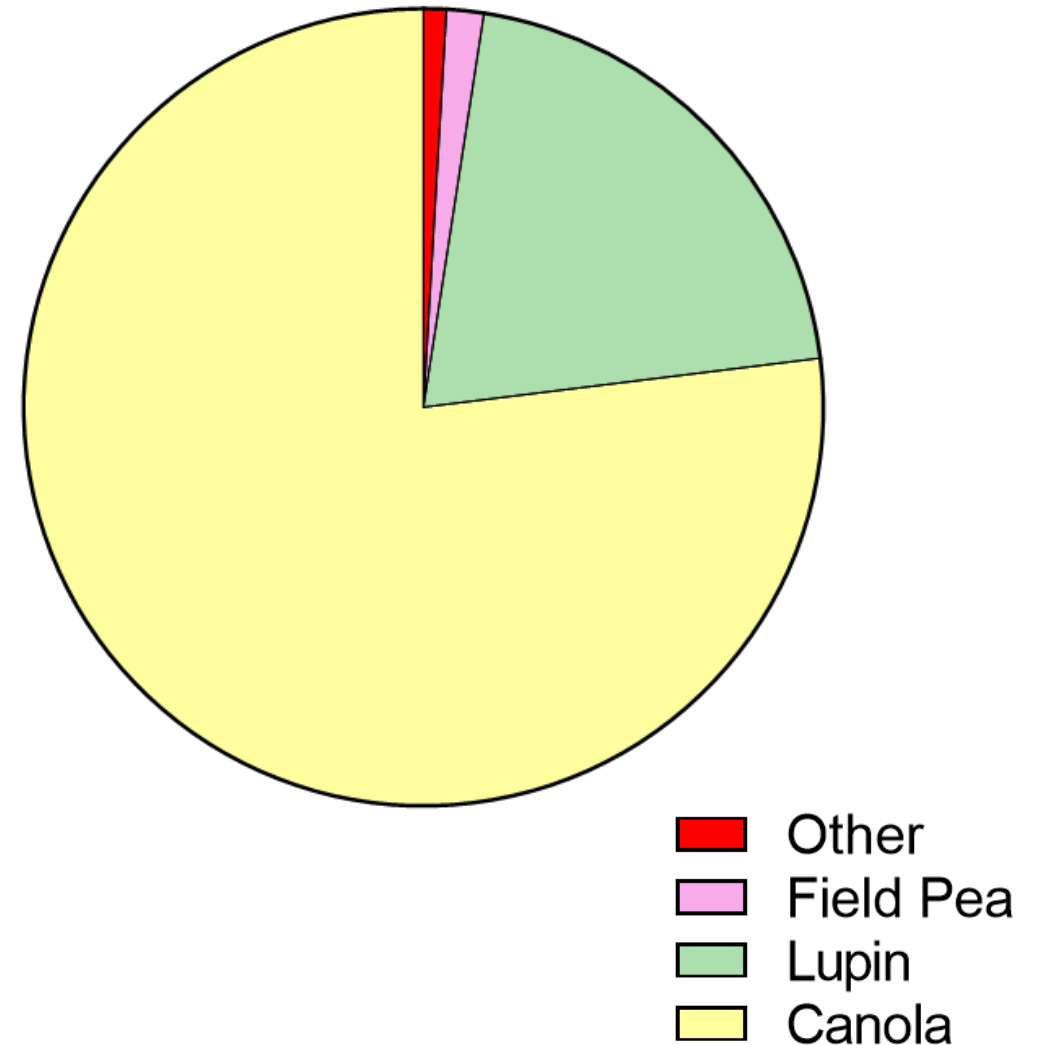
SOWING FLEXIBILITY OF CHICKPEA AND LENTIL IN THE WA FARMING SYSTEM



GRDCTM
GRAINS RESEARCH &
DEVELOPMENT CORPORATION

Non-cereal break crops in WA

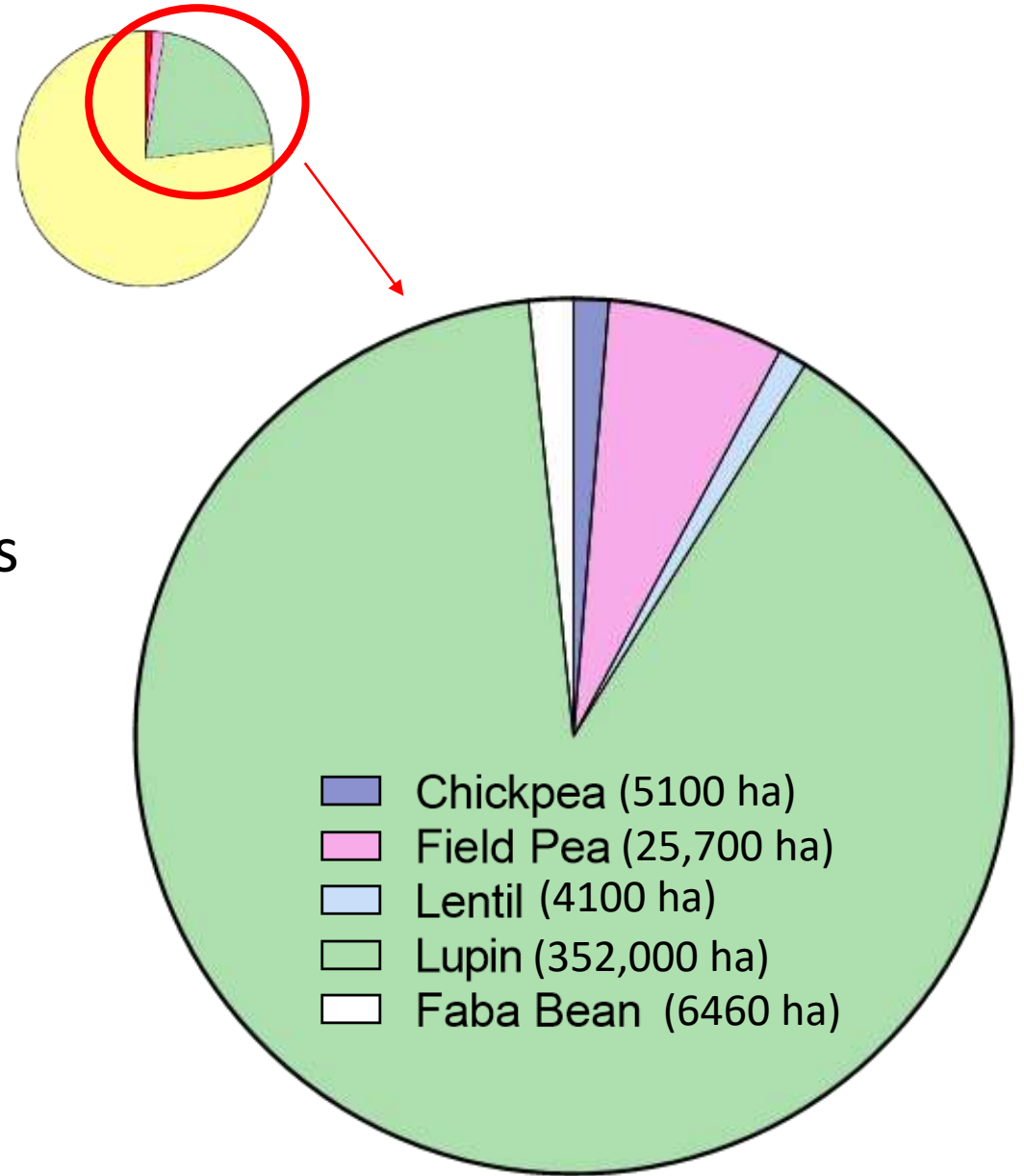
- Weed break
- Diseases break
- Pest break
- Soil improvement
 - Deep vs shallow rooted crops
 - N₂ fixing vs N-demanding crops
 - Increase microbiota and microfauna diversity
- Grazing
- Green manure
- FUTURE Yield benefits



Data from ABARES 2014-2018 (mean cropping area)

Why aren't we growing pulses?

- Poor broadleaf weed control
- Yield risk
- Diseases
- Uncertainty over appropriate soil conditions (acidity)
- Harvesting issues
- Difficulty with maintaining residue cover
- Logistics of seed sale
- N fertiliser is comparatively cheap



Why pulses? Why now?

- New varieties
 - Increased disease resistant
 - Suited to WA
 - New herbicide tolerances
- Increase in practice of liming broadened the potential growing area in WA
- High prices
- Grower interest
- Pulses are flexible
 - Sowing time (indeterminate)
 - Sowing depth (hypogeal germination)

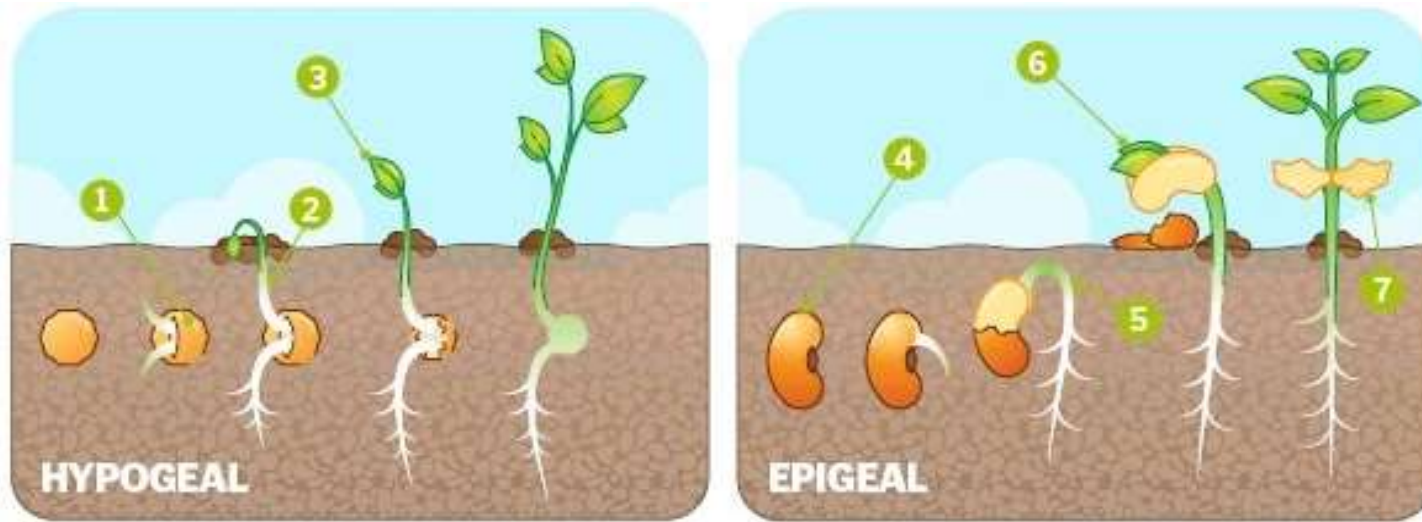


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Sowing flexibility – Sowing Depth



Chickpea and lentil have hypogeal germination – the cotyledons (seed storage organs) stay below ground and only a thin epicotyl emerges.



Sowing depth - why sow deep?

- Chase stored soil water from summer rain/previous fallow
- Reach a moist seed bed after a early or false break followed by warm weather
- Sow into the optimal sowing window
- Sow with confidence around main sowing program
- Avoid phytotoxicity of pre-emergent herbicides
- Reduce seed predation
- Improved nodulation (????)
- Deep fixed nitrogen (???)
- Better development of lateral roots near the soil surface (???)

Sowing depth trials 2019

- Lentil (PBA Bolt) and chickpea (PBA Striker)
- Standard practice depth (~ 5 cm) plus very deep sowing treatment of 20 cm
- Mid-April and mid-May sowing
- Dandaragan and Merredin.

Site	Sowing date	crop	Sowing depth			Soil moisture at sowing (%)		GSR (mm)	soil pH (CaCl ₂)	
			50 mm	120 mm	200 mm	0 - 100 mm	100 - 200 mm		50 mm	200 mm
Dandaragan (Deep sand)	April 15/16	Chickpea	✓		✓	4.46 ± 0.2	3.32 ± 0.3	242	6.5 ± 0.2	6.1 ± 0.5
		Lentil	✓		✓					
	May 27	Chickpea	✓		✓	1.56 ± 0.2	1.78 ± 0.3			
		Lentil	✓		✓					
Merredin (Sandy loam)	April 9	Chickpea	✓	✓		5.84 ± 0.3	7.50 ± 0.4	176.4	4.7 ± 0.2	4.6 ± 0.3
		Lentil								
	May 9	Chickpea	✓		✓	4.14 ± 1.2	8.05 ± 0.5			
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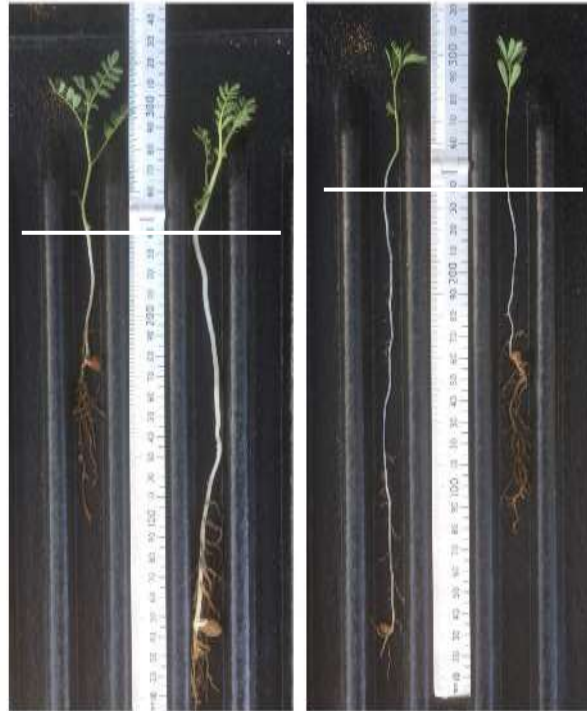
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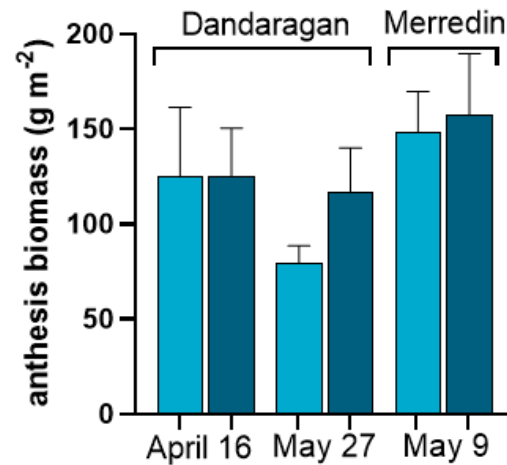
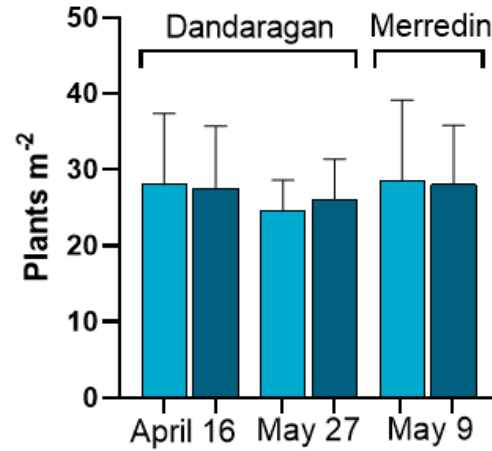
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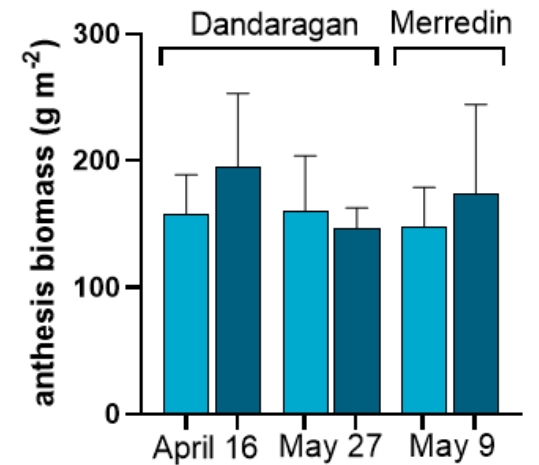
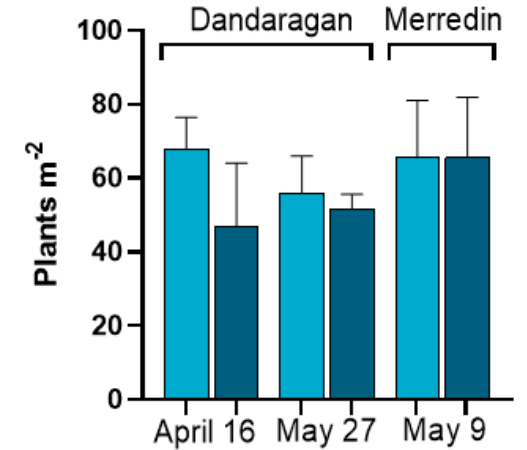
- Plots sown at 200 mm emerged a few days delay (3 – 6 days)
- NO significant difference in
 - Emergence number
 - Phenology
 - Anthesis and maturity biomass



Chickpea



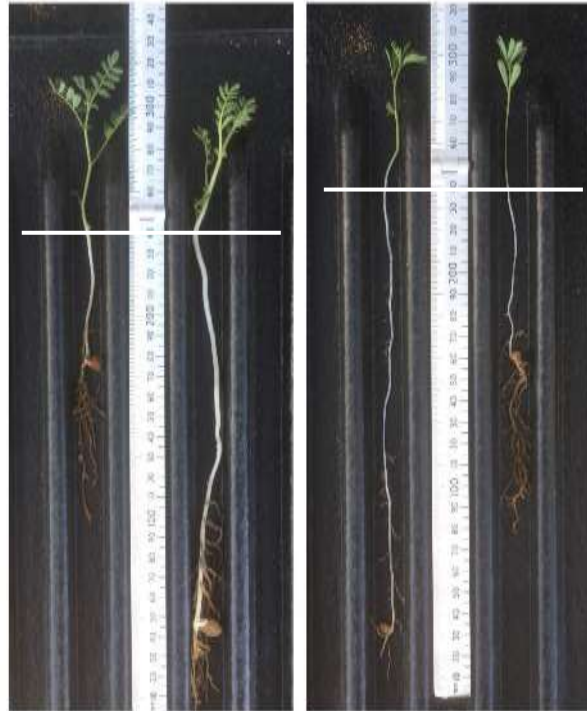
Lentil



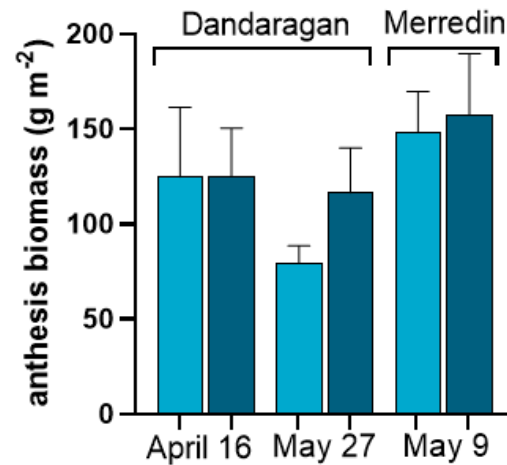
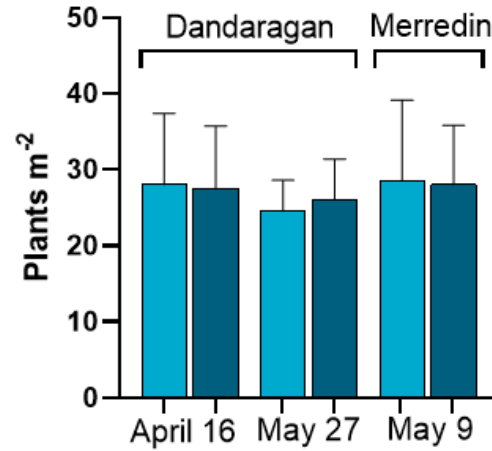
■ Sown at 50 mm depth

■ Sown at 200 mm depth

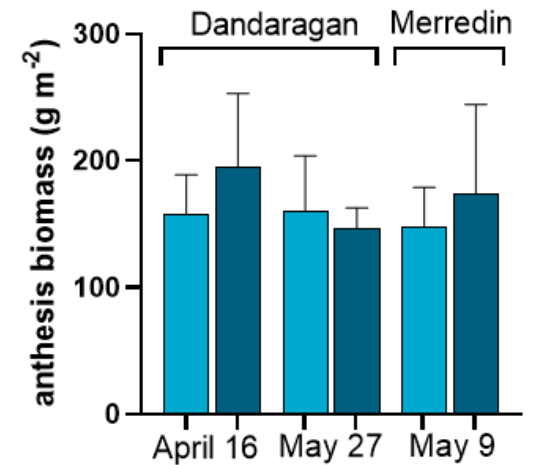
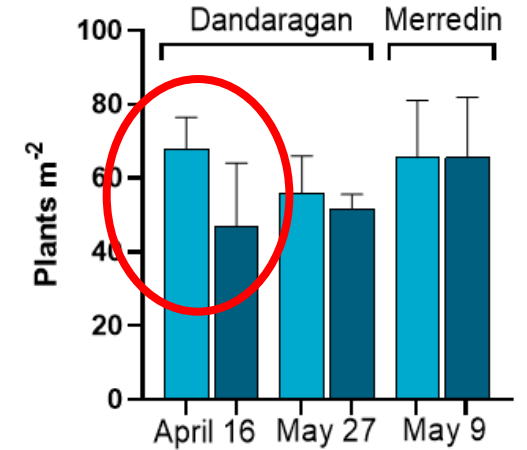
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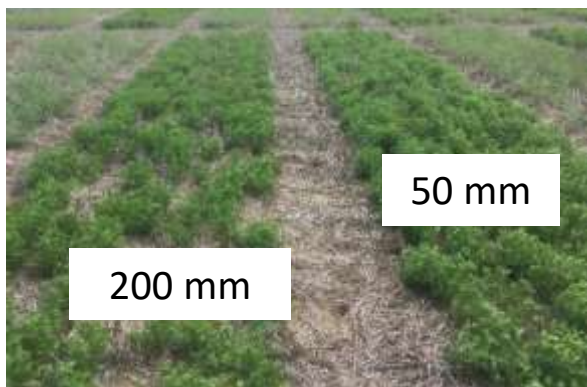
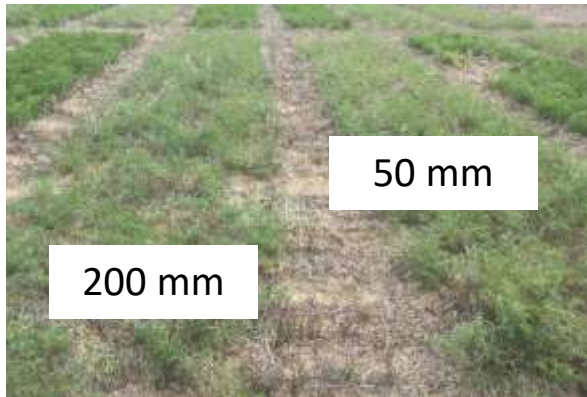


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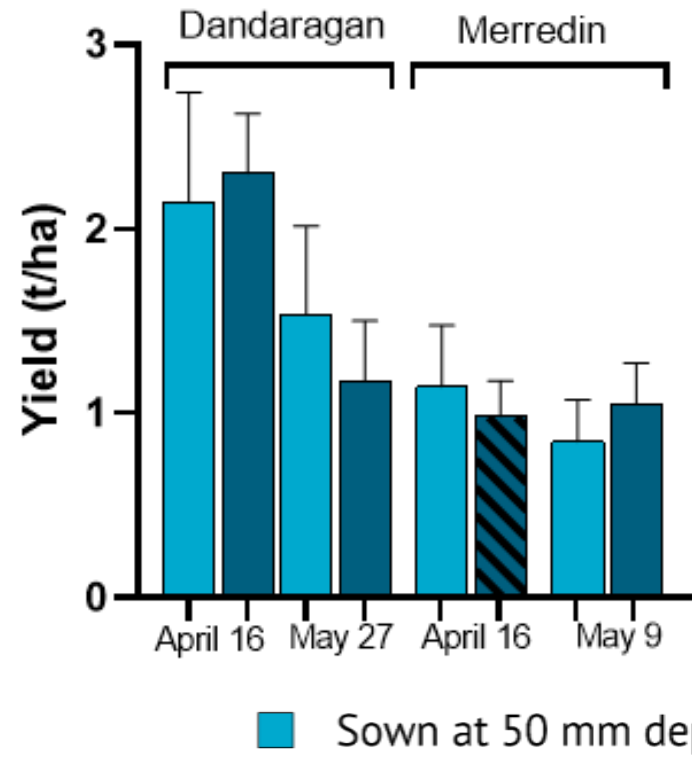
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No significant difference in yield regardless of sowing depth

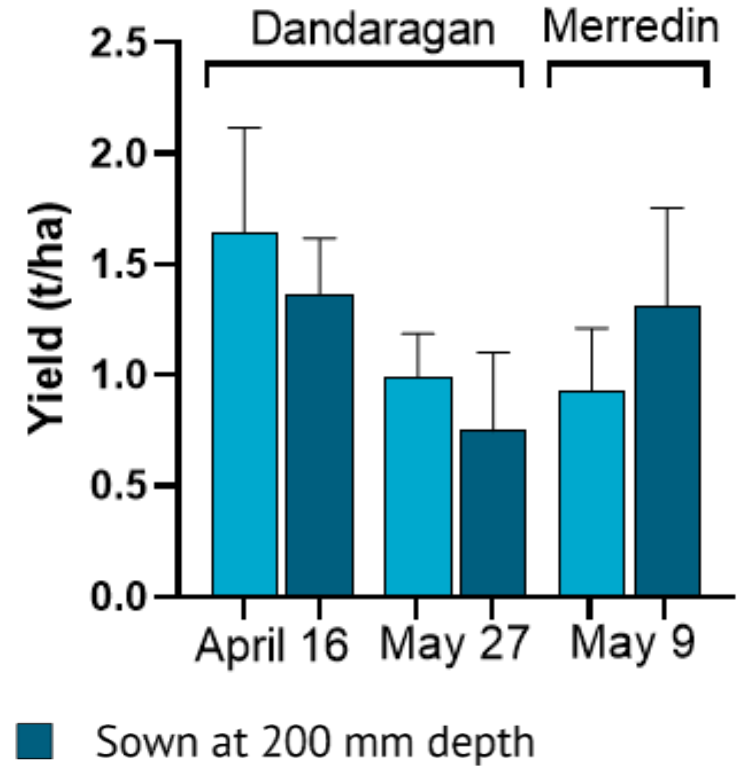
April sowing gave higher yields than May



Chickpea



Lentil



Yields (t/ha)

SITE	SOWN	Chickpea (Striker)			Lentil (Bolt)		
		Yield	SE	CV	Yield	SE	CV
Merredin	April 9	1.06	± 0.27		na		
Merredin	May 9	0.93	± 0.23		1.12	± 0.41	
Dandaragan	April 16	2.22	± 0.47		1.50	± 0.39	
Dandaragan	May 27	1.30	± 0.39		0.87	± 0.30	

Take home messages

- Chickpea and lentil can be sown to depths of up to 200 mm with no impact on establishment, phenology and yield.
- Chickpea and Lentil can be successfully grown on ameliorated sands outside the traditional growing areas for these crops

What's next?

- More in-depth field trials – pea and faba?
 - Confirming these results
 - Root architecture and depth
- Variety screening
- Germination/soil/moisture interactions





Thank you!

- GRDC
- West Midlands Group
- Growers in Merredin and Dandaragan who hosted trials
- The farming systems team at CSIRO



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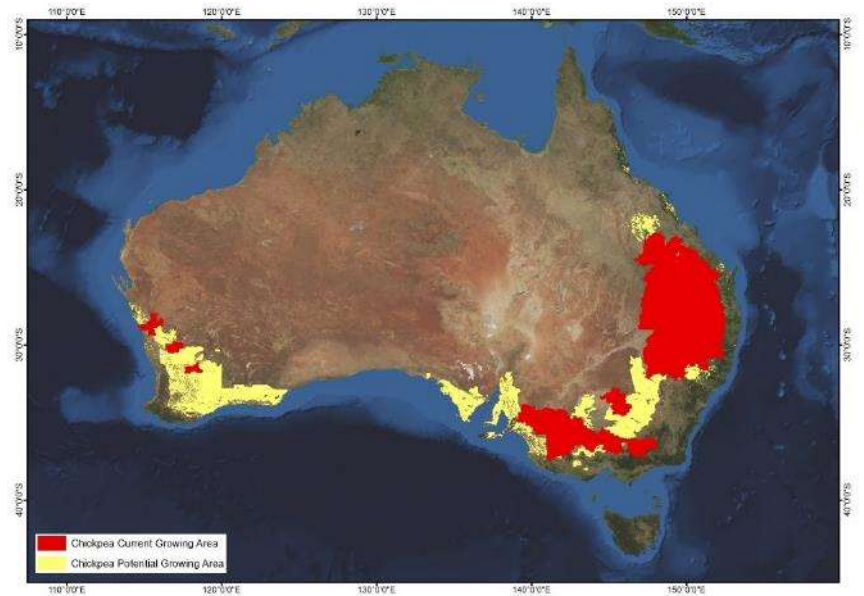
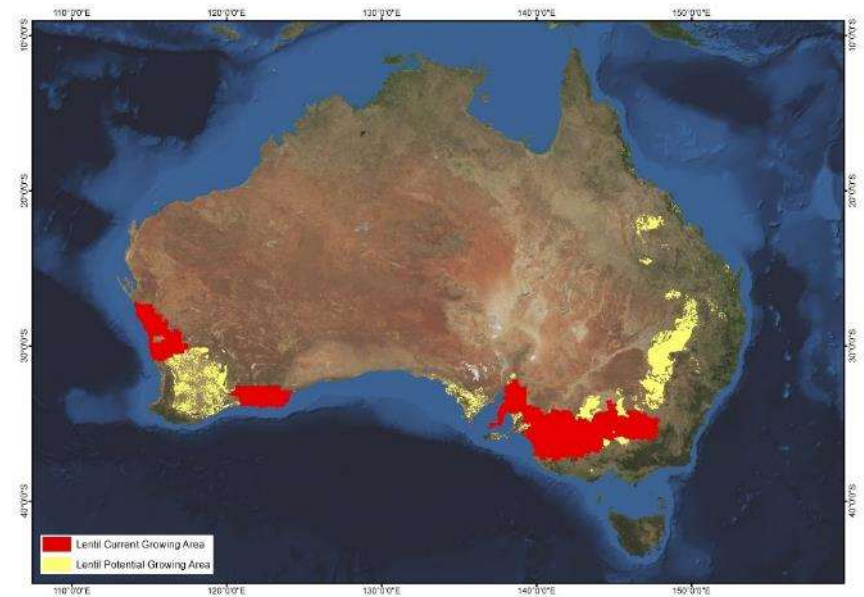
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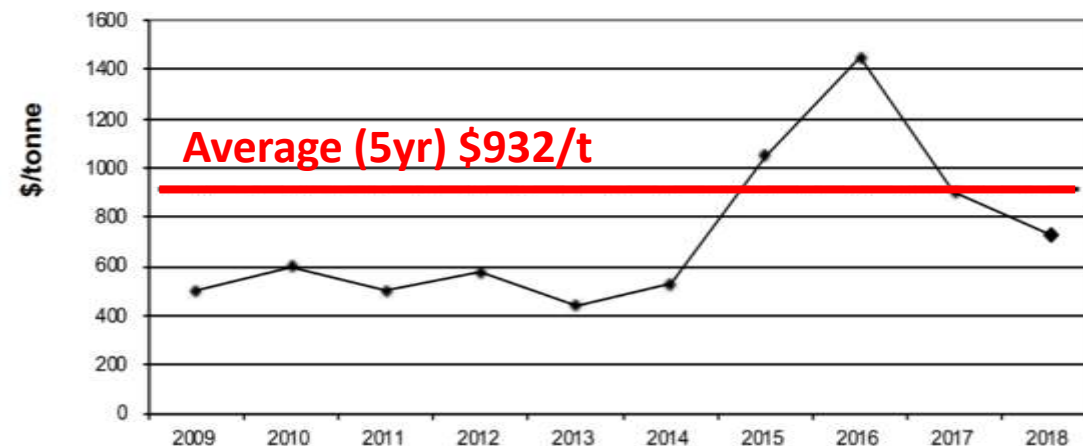


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CHICKPEA
HISTORIC PRICES (post harvest)



RED LENTILS
HISTORIC PRICES (post harvest)

