Department of Primary Industries and Regional Development
GOVERNMENT OF WESTERN AUSTRALIA

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Protect
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Innovate

Long coleoptile wheat and seeding depth on ameliorated soils

Muhammad Javid
Stephen Davies

Grains Industry Day

Muhammad.Javid@dpird.wa.gov.au | Stephen.Davies@dpird.wa.gov.au

Potential benefits of long coleoptile wheat on ameliorated soils

- **Ensuring establishment with poor seeding depth control**
- **Improved crop emergence in the event of furrow infill**
- **Better emergence with surface crusting**
  (To be determined)
- **Greater resilience to rapid topsoil drying**

Six row seeder with Ausplow Deep Blade System (DBS) tines

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Experimental treatments – Merredin

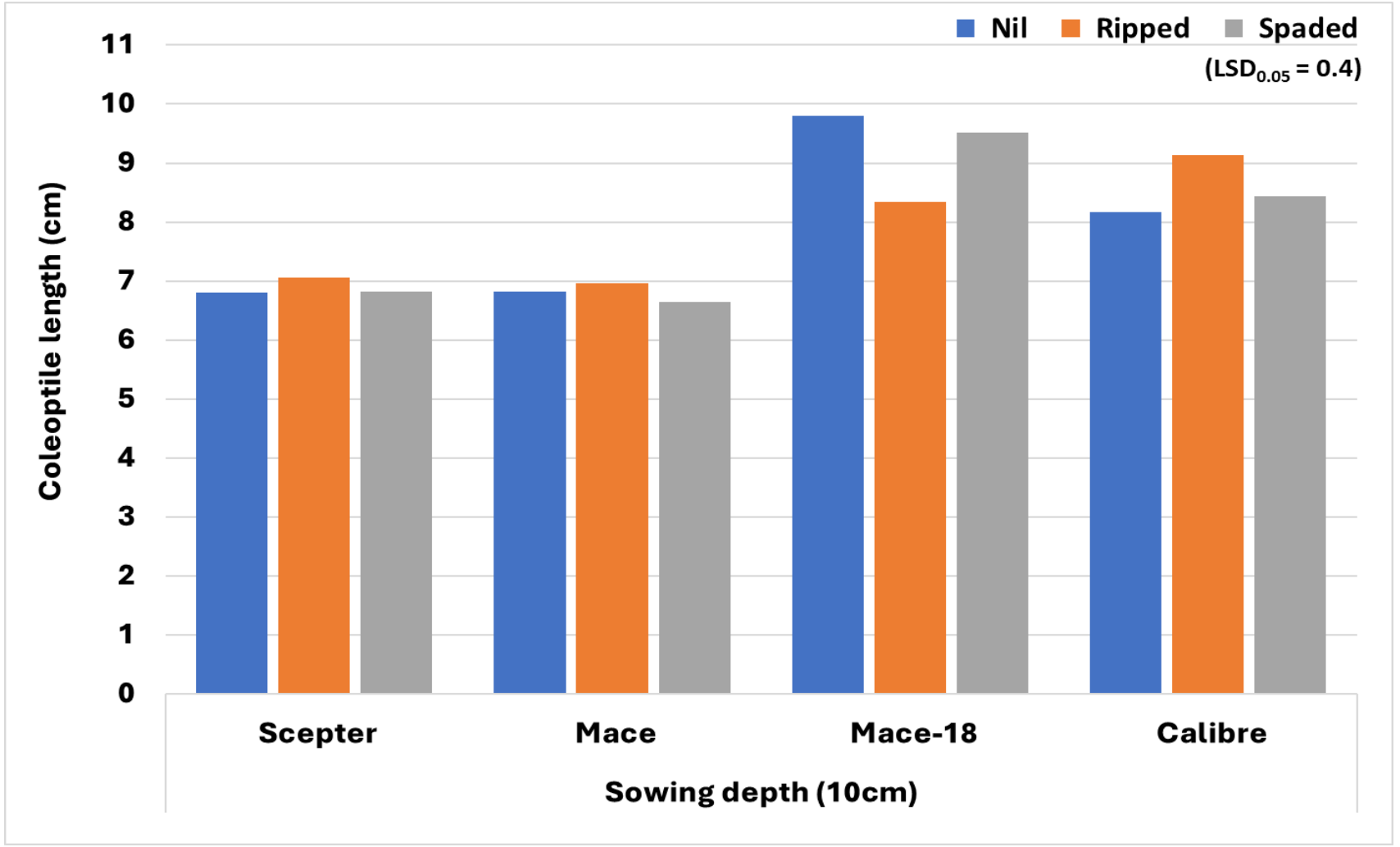
Variety	Coleoptile length*	Seeding depths	Soil treatments	Replications
1. Scepter	Short	1. Shallow (4 cm)	1. Nil	4
2. Calibre	Longer	2. Deep (10 cm)	2. Ripped	
3. Mace	Short		3. Spaded	
4. Mace-18	Long			

Sowing date: 26 May 2023

***** Indicative coleoptile length classification

Muhammad.Javid@dpird.wa.gov.au | Stephen.Davies@dpird.wa.gov.au

Field expression of long coleoptile trait



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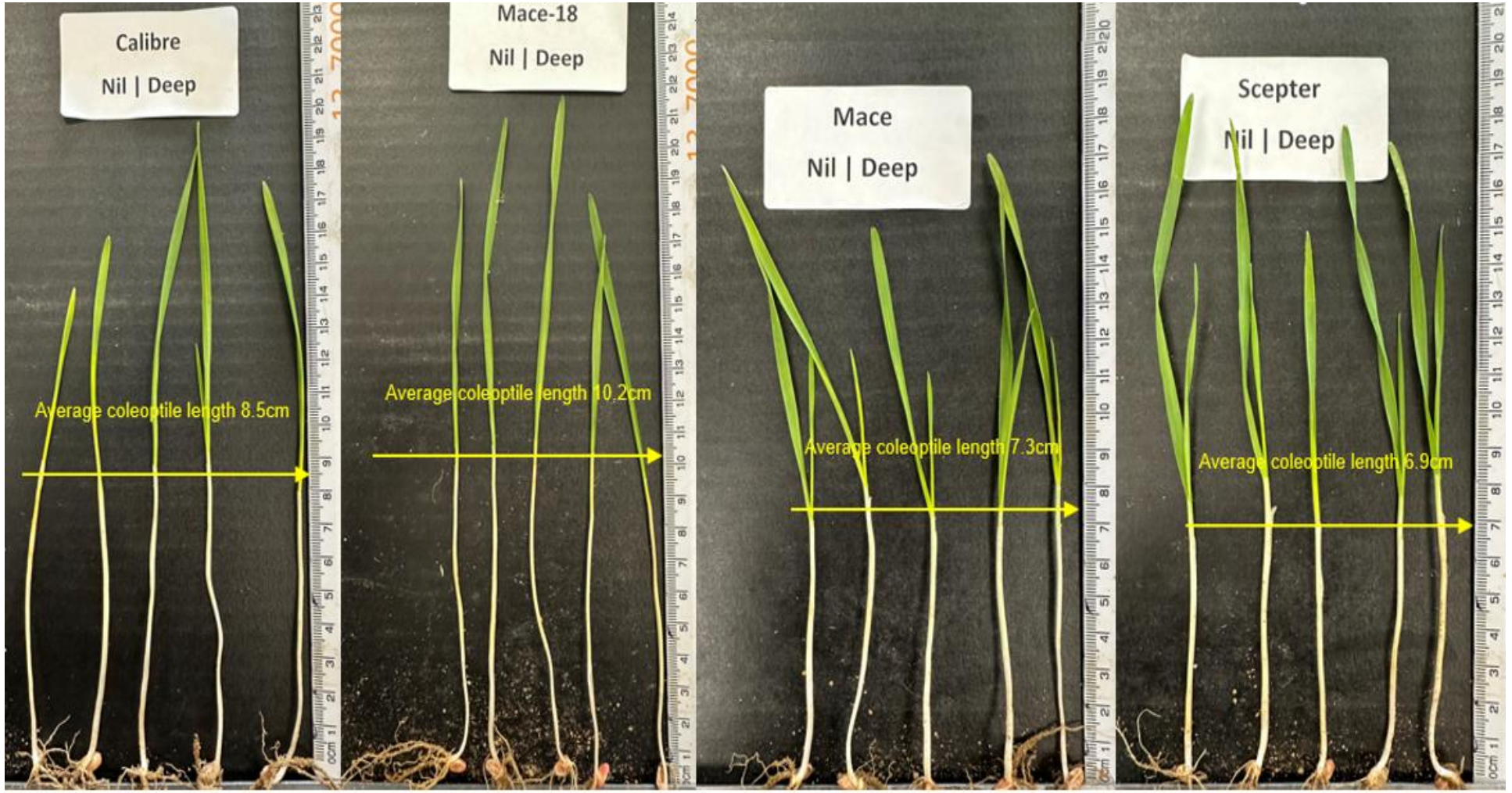

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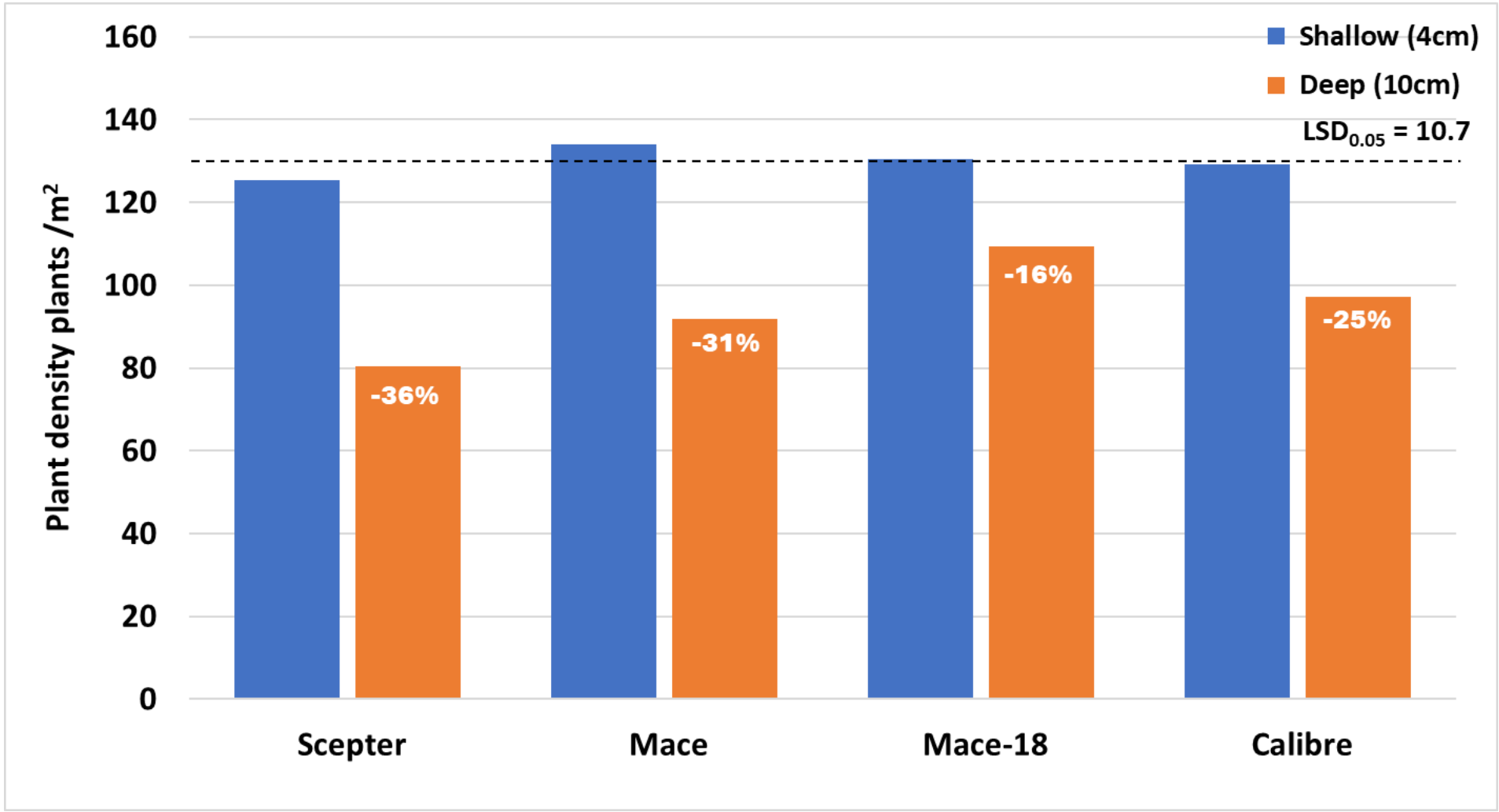
Wheat – plant density plants/m^2



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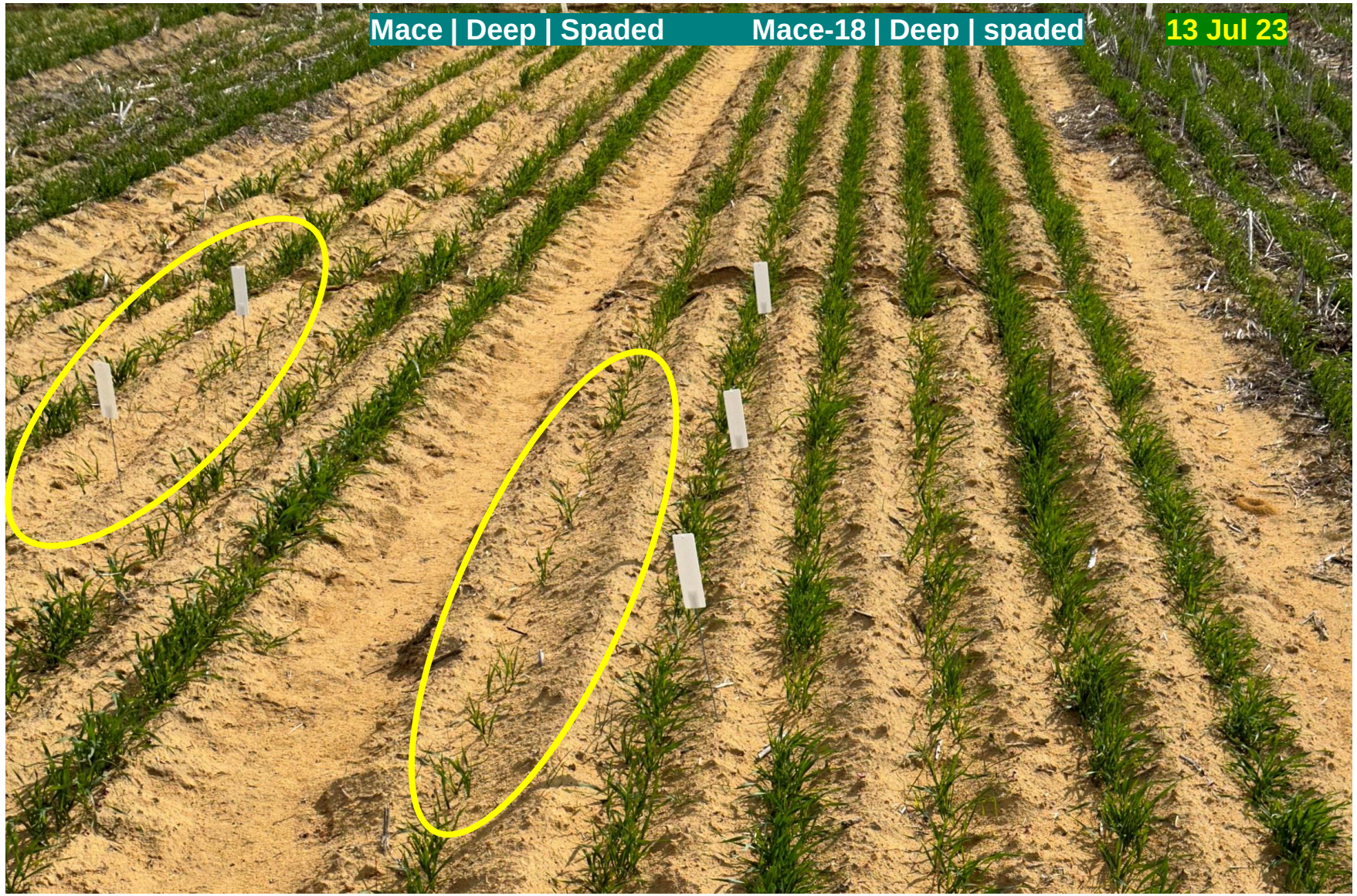
Establishment responses of short *versus* long coleoptile wheat



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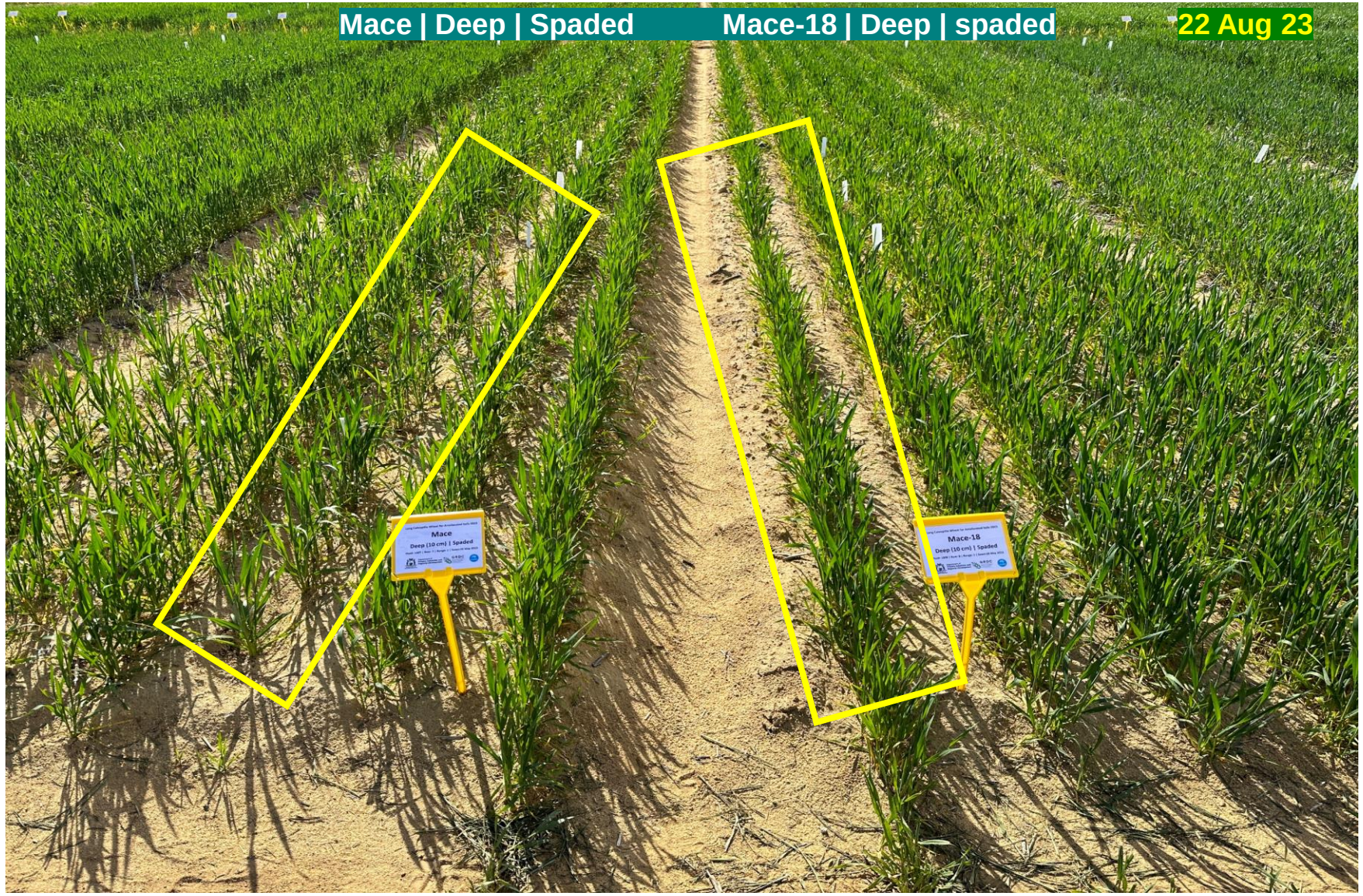

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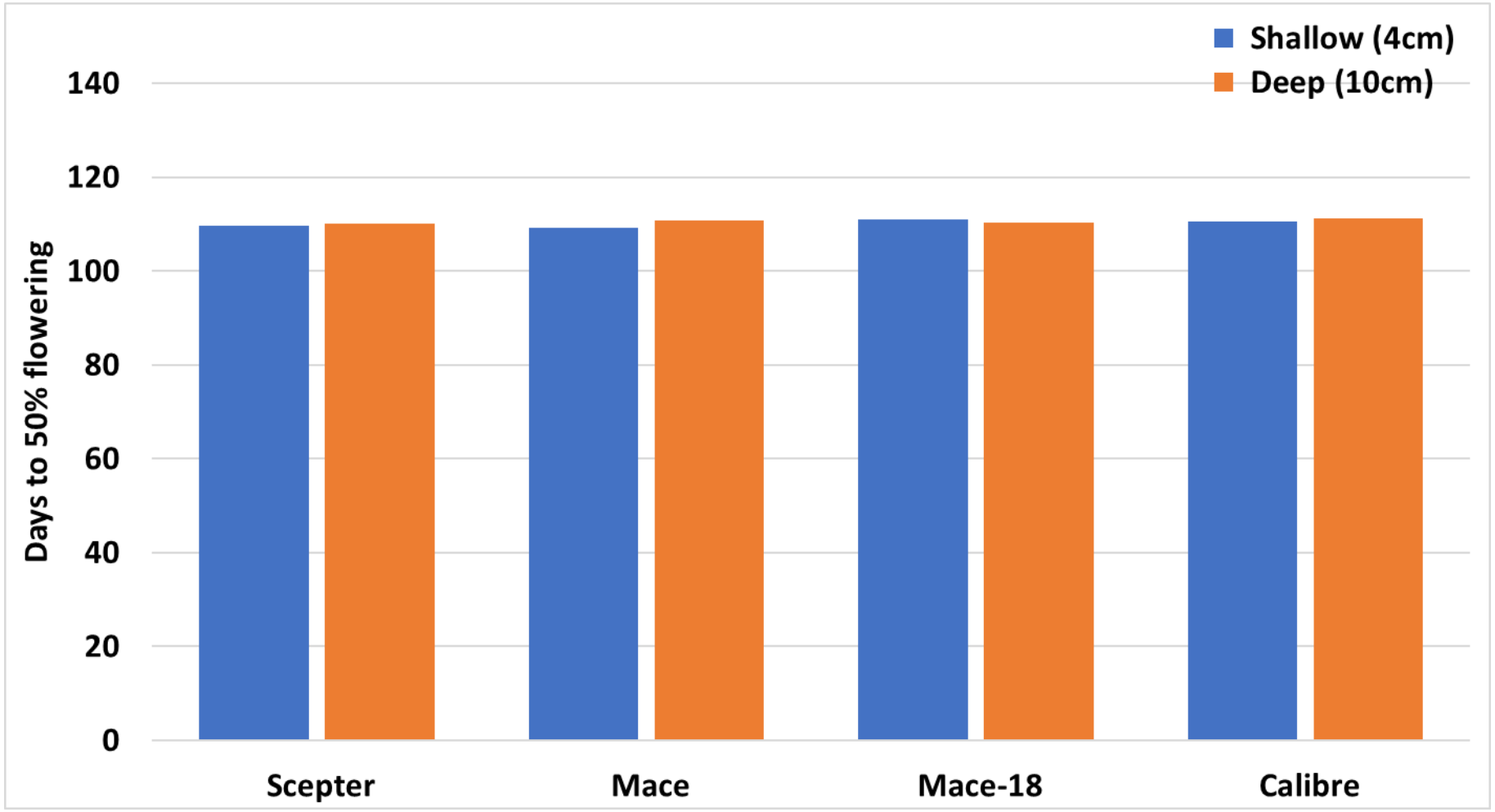
Deep sowing didn’t delay flowering



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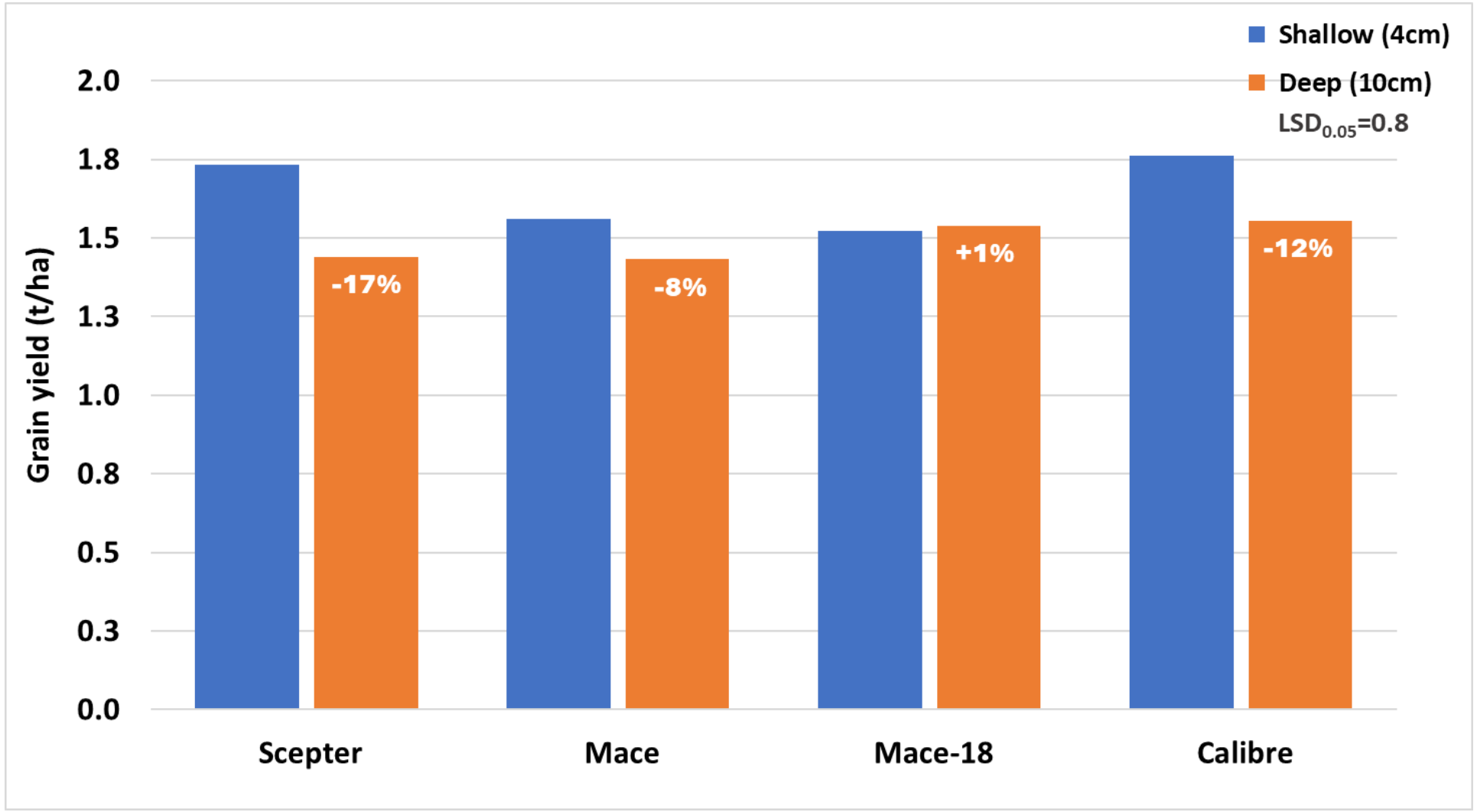
Grain yield response to seeding depth



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Key messages

- **Long coleoptile trait can assist crop establishment**
- **Crop phenology was not changed by seeding depth in this experiment**
- **Long coleoptile trait did not reduce grain yield in this experiment**
- **Spading treatment significantly improved crop weed competition**
- **Soil amelioration significantly increased grain yield by 16-19% over control**

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Thank you

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Integrating long coleoptile wheat into Australian farming systems through an integrated understanding of genetics, management and environment. CSP2212-007RTX

Thanks to:
DPIRD staff
Dr Greg Rebetzke - CSIRO
GRDC

Future work – long coleoptile trait

- Emergence through surface crust after amelioration
- Emergence with seed depth and rapid topsoil drying after amelioration
- Emergence with different sand-types which can have varying ‘soil strength’ after disturbance

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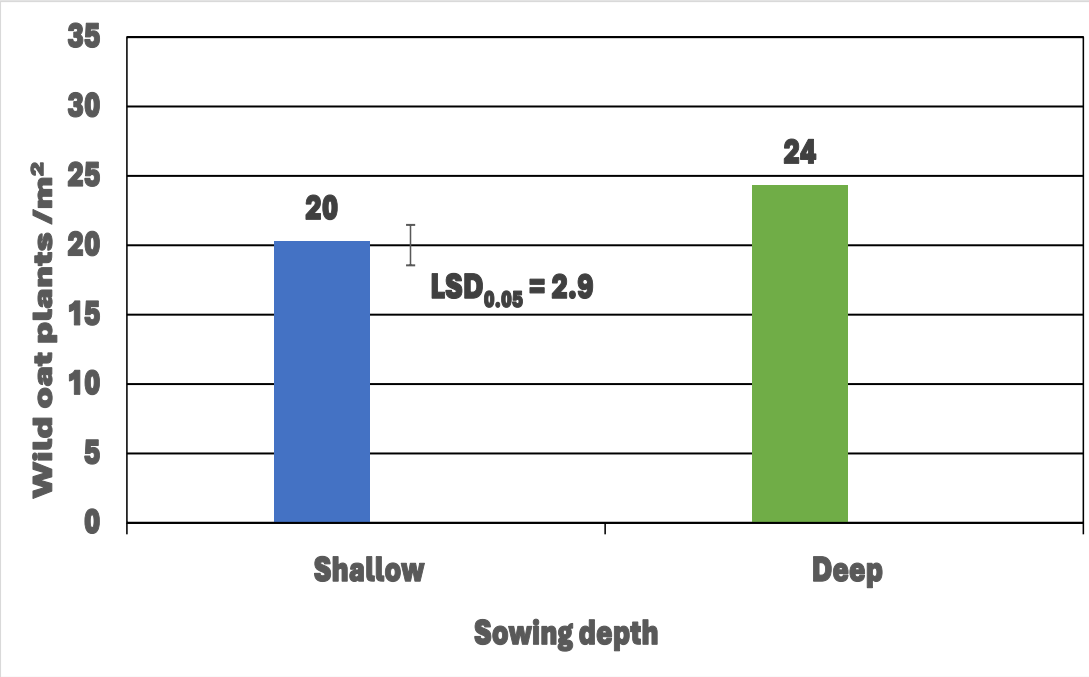
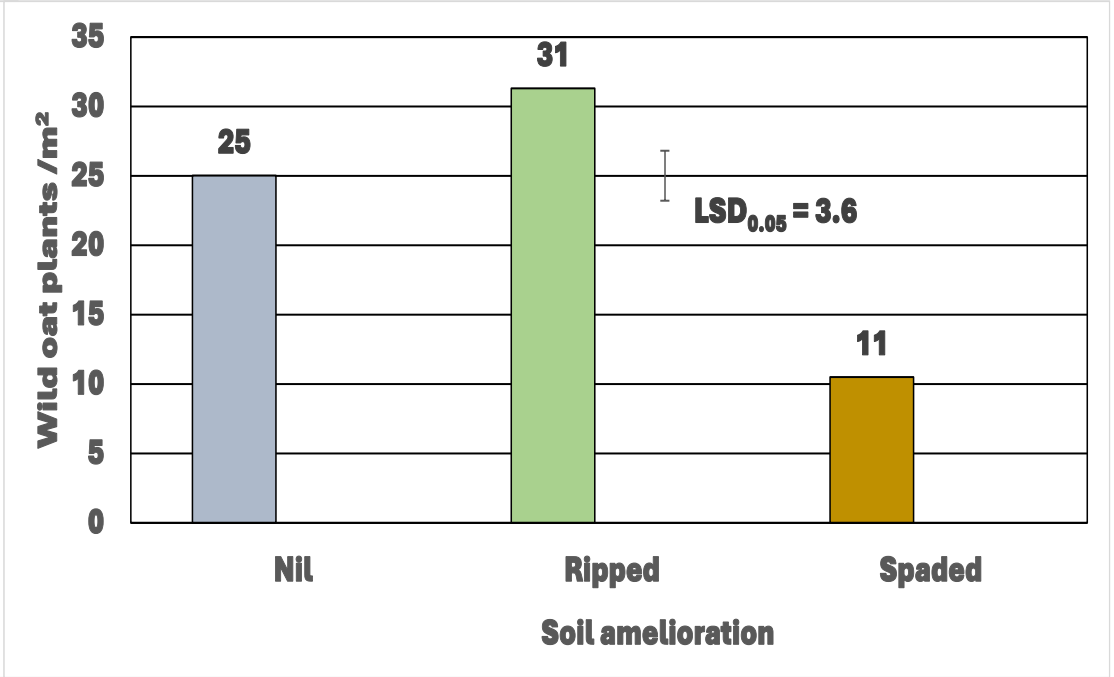
Improved weed competition – wild oats





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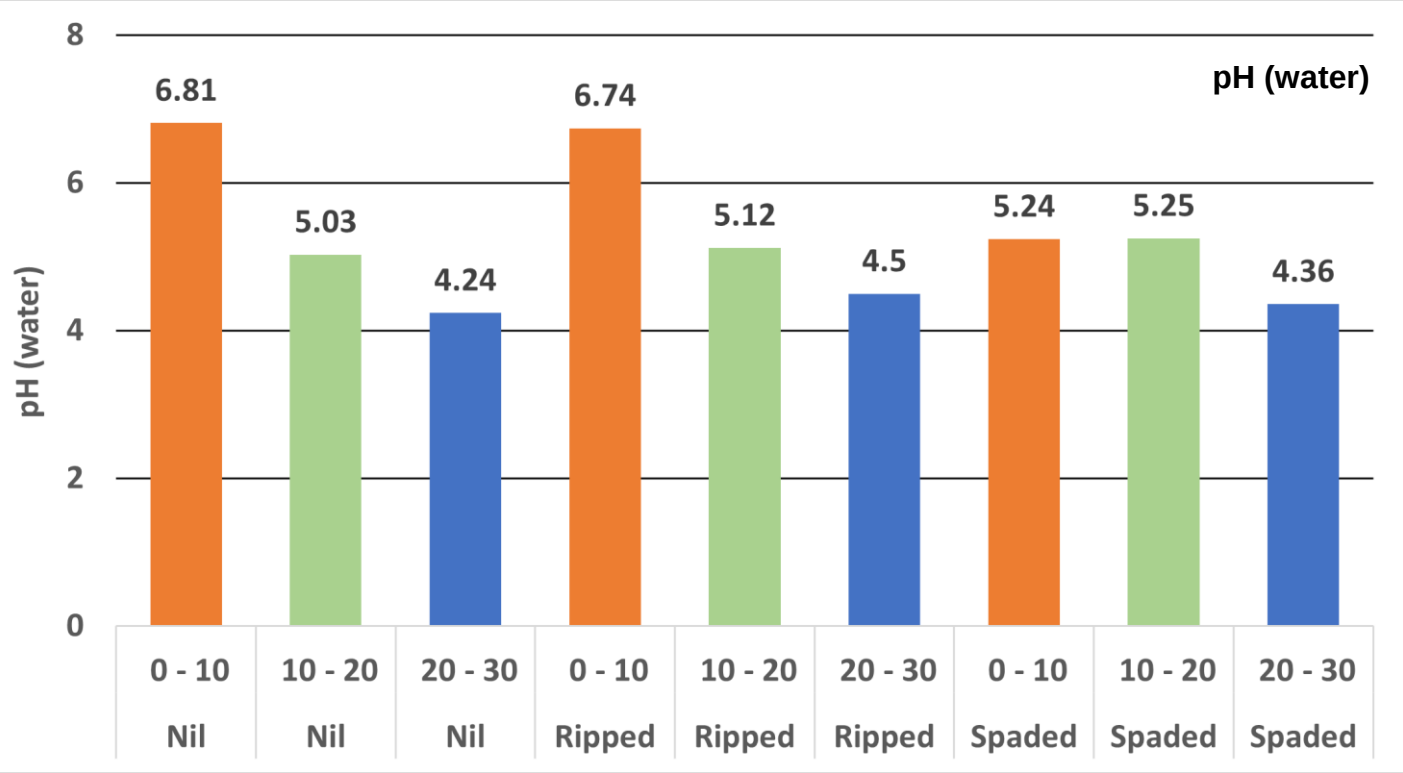
Trial maintenance

Date	Timing	Chemical	Rate	Units	BBCH
19/05/2023	Knockdown	Sprayseed	2	L/ha	0
25/05/2023	IBS	Alpha Duo	0.2	L/ha	0
25/05/2023	IBS	Chlorpyrifos 500	0.2	L/ha	0
25/05/2023	IBS	Sakura	0.12	L/ha	0
25/05/2023	IBS	Sprayseed	2	L/ha	0
25/05/2023	IBS-Banded (Fert.)	Macro Pro Extra	110	kg/ha	0
25/05/2023	IBS-in furrow (Fert.)	Flexi N	70	L/ha	0
12/07/2023	Grass weed	Boxer Gold	3	L/ha	14-16
20/07/2023	Broadleaf weed	MCPA LVE	0.40	L/ha	15-21
20/07/2023	Broadleaf weed	Velocity	0.80	L/ha	15-21
14/08/2023	Fert.	Flexi N	100	L/ha	37-39

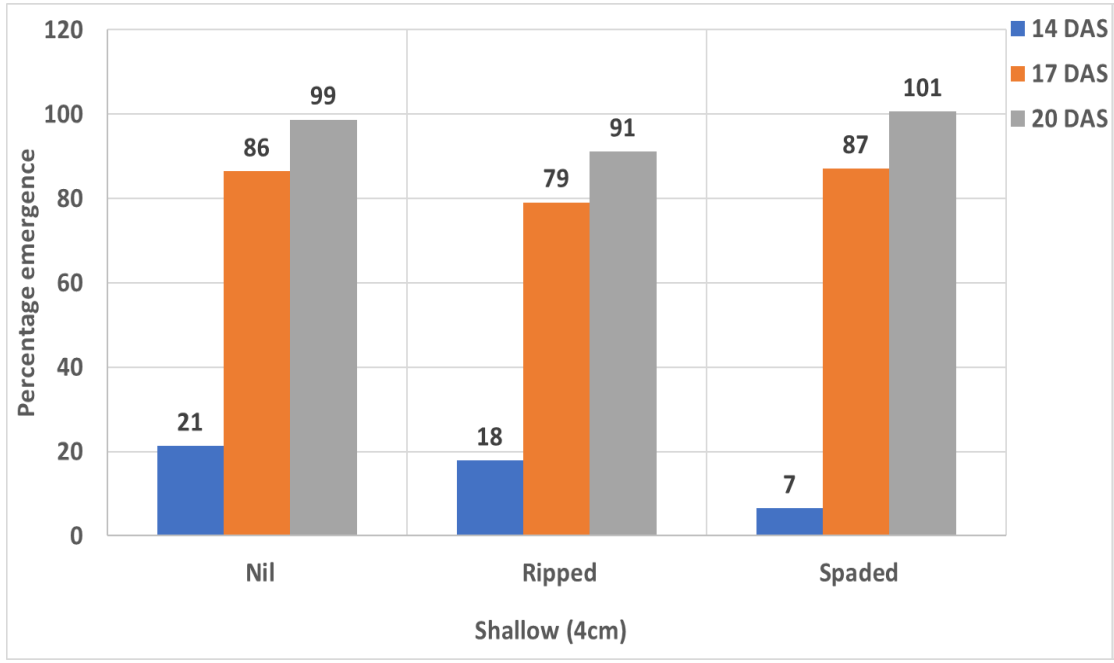
pH and subsoil temperature

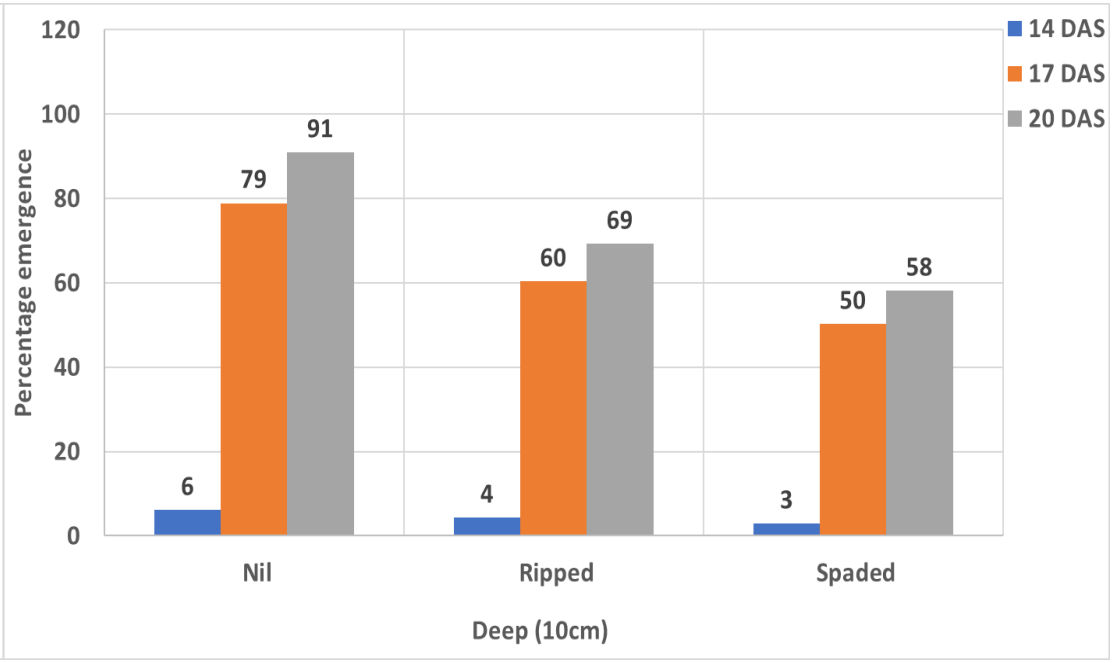


Temperature at seed depth – 2WAS

Temperature (°C)	Shallow	Deep	Soil surface
Night	10.8	11.6	6.9
Day	13.3	13	15.2

Percentage emergence after 3 weeks of sowing



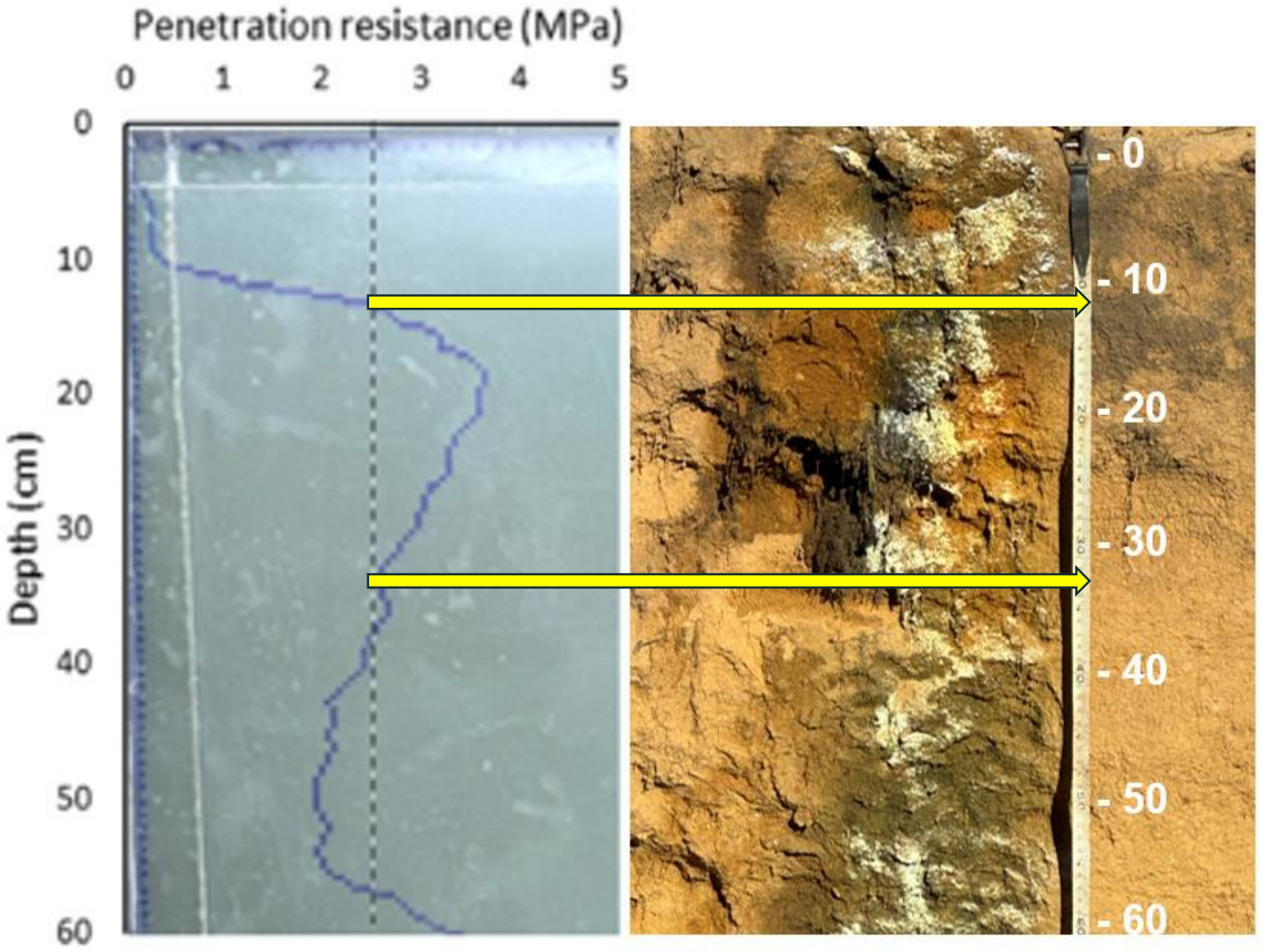


Merredin Site

- **Soil pH**

Depth	Treatment	Soil pH
0-10cm	Nil	6.81
	Ripped	6.74
	Spaded	5.24
10-20cm	Nil	5.03
	Ripped	5.12
	Spaded	5.25
20-30cm	Nil	4.24
	Ripped	4.50
	Spaded	4.36

- **Soil strength**
  - **Hard pan between13-35cm**



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Seeder used for this trial

Six row seeder with Ausplow Deep Blade System (DBS) tines that have independent seed placement via the parallelogram attached press wheels.

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