

SARDI

Pulse Check Update

Wednesday 3 March 2021





Coomandook SPA Species x Variety 2020

Co-Operating Grower: Mark White

Previous Crop: Cereal Stubble

Sowing Date: 06-May-20

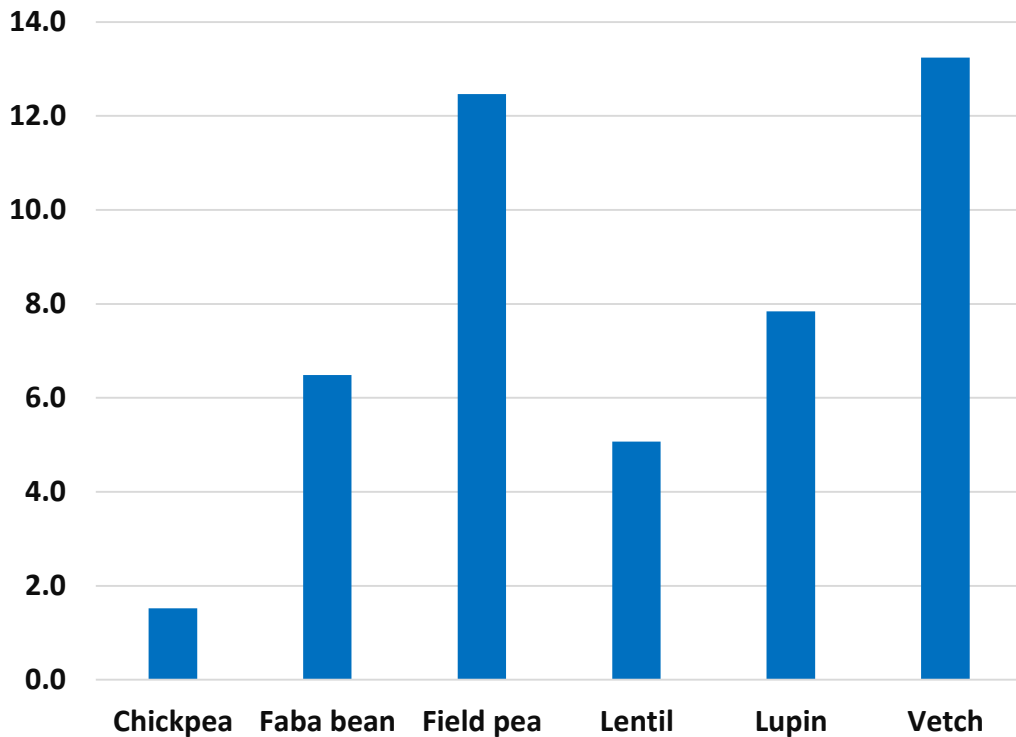
Harvest Dates: Faba Bean, Lupin, Vetch, Lentil, Field Pea 25-Nov-20
Chickpea 2-Dec-20

	Date	Product	Rate/ha		Date	Product	Rate/ha
Fertiliser	06-May	MAP	100 kg	Herbicide	06-May	Roundup PowerMAX®	2.0 L
					06-May	Goal™	75 ml
Inoculant	06-May	As required per crop type			06-May	TriflurX	1.2 L
					06-May	Avadex® Xtra	1.6 L
Fungicide	03-Jun	Tebuconazole 430	145 ml		06-May	Terbyne® 875	1.2 kg
	22-Jul	Mancozeb® 750 WG	1.5 kg		03-Jun	Clethodim	500 ml
	22-Jul	Howzat® SC	500 ml		03-Jun	Hasten	1.0 L
	24-Aug	Mancozeb® 750 WG	1.5 kg				
	24-Aug	Aviator® Xpro®	500 ml	Insecticide	06-May	Lorsban® 500 EC	500 ml
	21-Sep	Aviator® Xpro®	500 ml		03-Jun	Lorsban® 500 EC	500 ml
	19-Oct	Howzat® SC	500 ml		03-Jun	Alpha Duo	125 ml
					22-Jul	Karate Zeon®	30 ml
Pesticide	14-May	Snail Bait	8.0 kg		24-Aug	Karate Zeon®	30 ml
	19-Oct	Snail Bait	8.0 kg		21-Sep	Alpha Duo	125 ml

Depth cm		0-10	10-30	30-60
Colour		BRGR	BROR	LTBR
Gravel	%	0	0	0
Texture		2.0	3.0	3.0
Ammonium Nitrogen	mg/kg	1	< 1	< 1
Nitrate Nitrogen	mg/kg	11	4	2
Phosphorus Colwell	mg/kg	16	10	3
Potassium Colwell	mg/kg	158	216	220
Sulfur	mg/kg	7.3	6.9	14.5
Organic Carbon	%	0.86	0.38	0.49
Conductivity	dS/m	0.101	0.138	0.166
pH Level (CaCl2)		6.6	7.6	7.8
pH Level (H2O)		7.0	8.5	8.9
DTPA Copper	mg/kg	0.64	0.34	0.28
DTPA Iron	mg/kg	34.10	23.50	21.90
DTPA Manganese	mg/kg	4.38	1.29	1.11
DTPA Zinc	mg/kg	2.29	0.62	1.16
Exc. Aluminium	meq/100g	0.050	0.110	0.090
Exc. Calcium	meq/100g	6.95	9.96	15.32
Exc. Magnesium	meq/100g	0.61	2.30	4.29
Exc. Potassium	meq/100g	0.31	0.49	0.55
Exc. Sodium	meq/100g	0.12	0.46	1.03
Boron Hot CaCl2	mg/kg	0.68	1.32	2.72
PBI		33.5	66.2	122.5

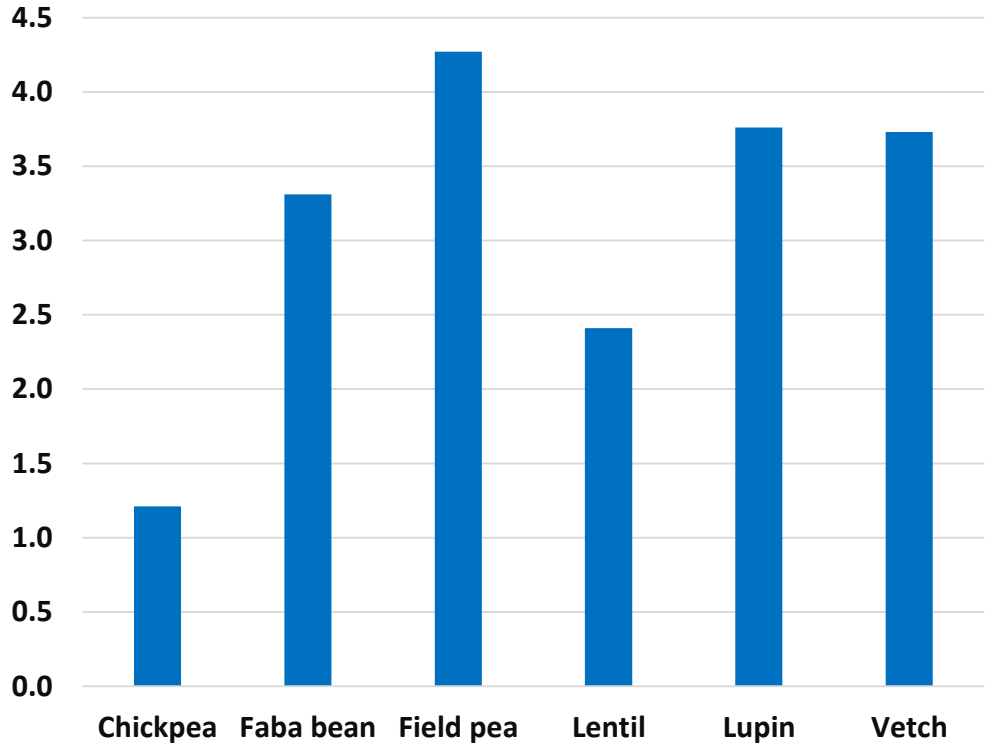


2020 Species X Variety Trial Biomass (DM t/ha)



2020 Species X Variety Trial

Grain Yield (t/ha)



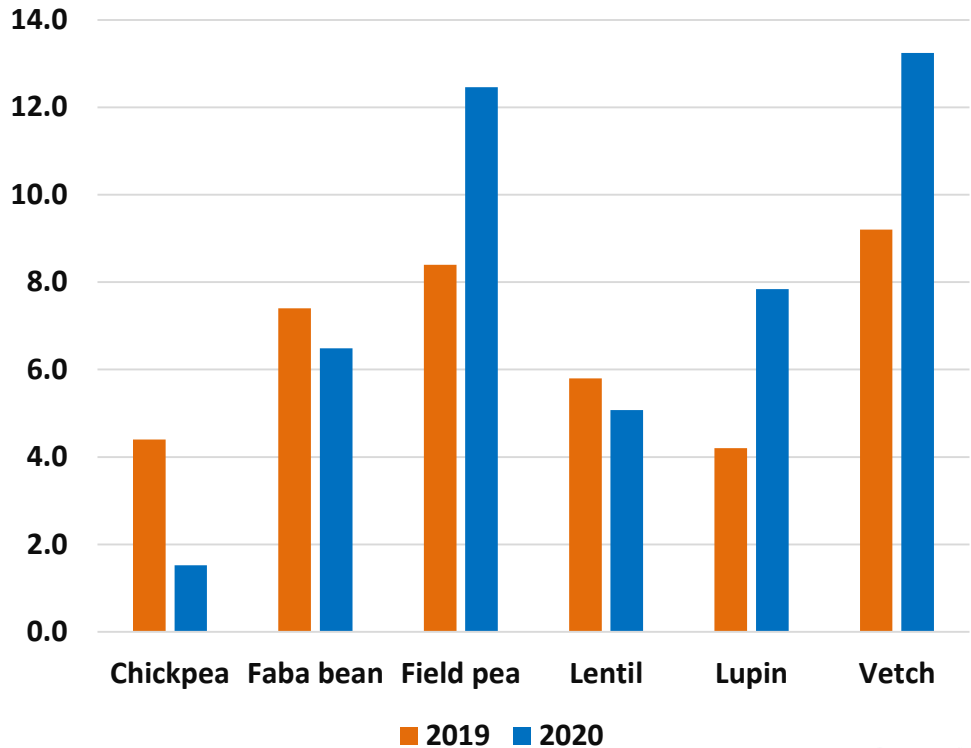
2020 Species X Variety Trial

Grain Yield (t/ha)

Crop Type	Yield (t/ha)	\$/t	Gross Income
Chickpeas	1.21	723	\$875
Faba Beans	3.31	330	\$1092
Field Peas	4.27	337	\$1439
Lentils	2.41	615	\$1482
Lupins	3.76	400	\$1504
Vetch	3.73	600	\$2238

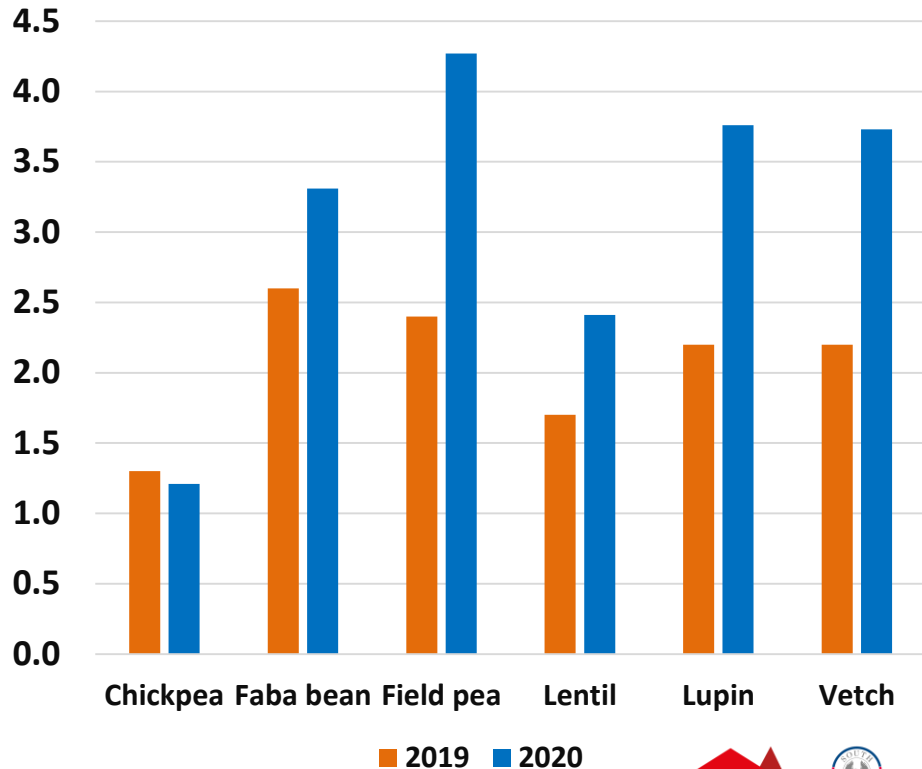


2019 and 2020 Species X Variety Trial Biomass (DM t/ha)



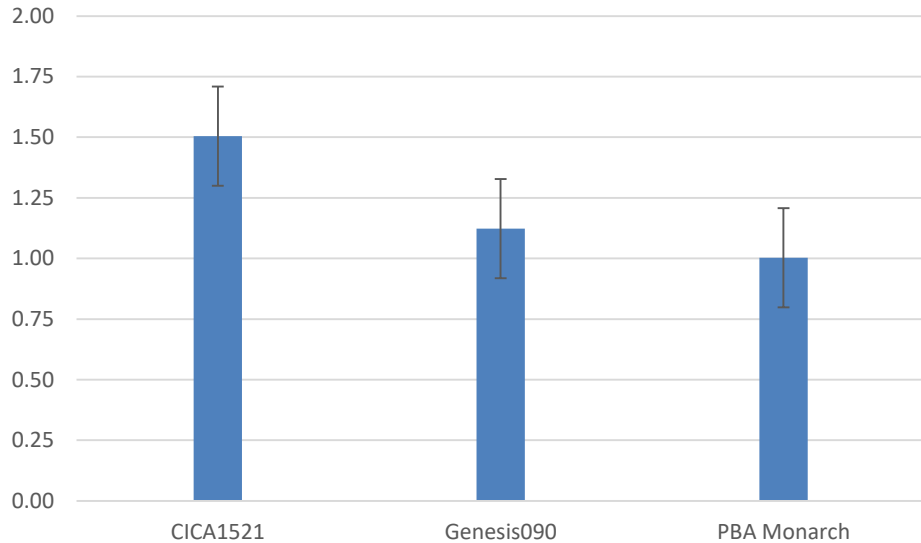
2019 and 2020 Species X Variety Trial

Grain Yield (t/ha)



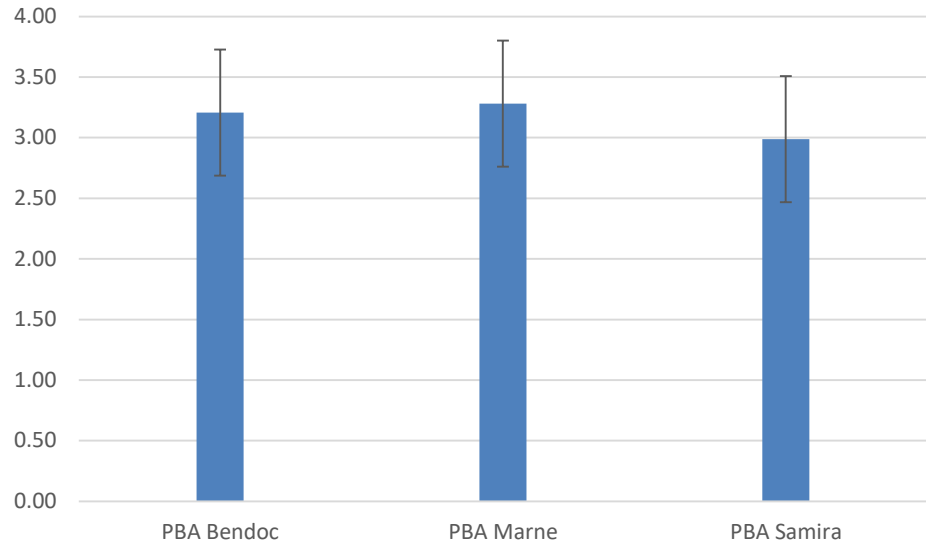
2020 Species X Variety Trial

Grain Yield (t/ha)



2020 Species X Variety Trial

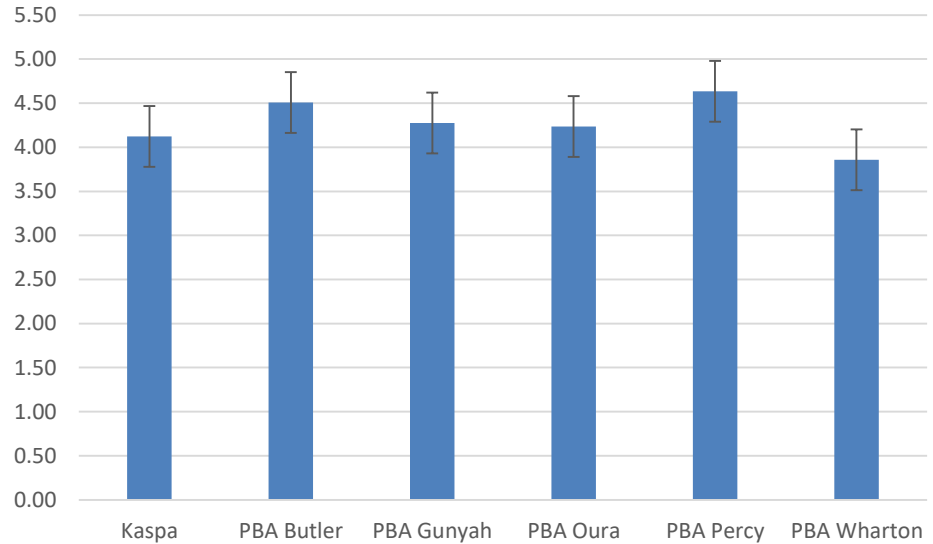
Grain Yield (t/ha)





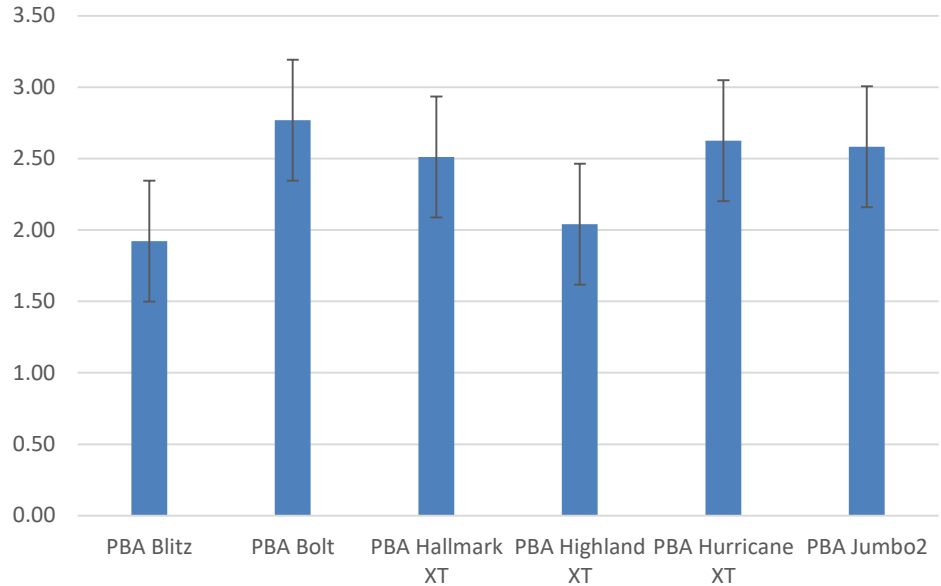
2020 Species X Variety Trial

Grain Yield (t/ha)



2020 Species X Variety Trial

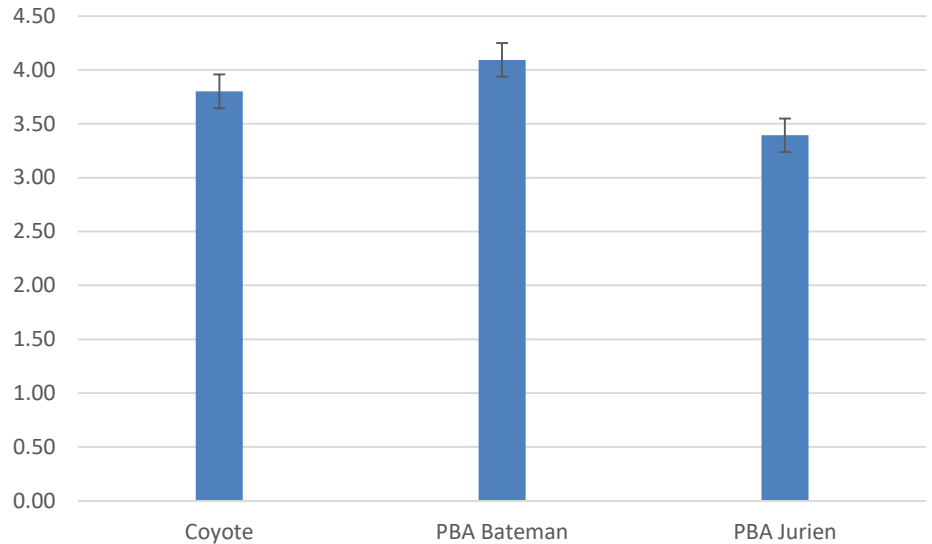
Grain Yield (t/ha)





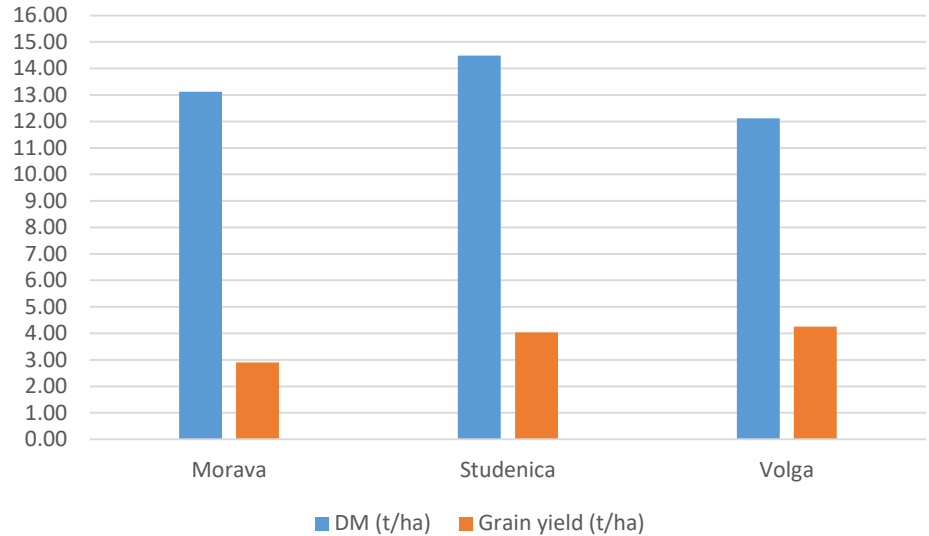
2020 Species X Variety Trial

Grain Yield (t/ha)



2020 Species X Variety Trial

Grain Yield (t/ha)







Increasing the effectiveness of nitrogen fixation in pulse crops

Brendan Wallis

3rd March 2021

Acknowledgments

- GRDC



- SARDI



Project Background

- Extension of GRDC investments to improve N fixation and nodulation of pulses
- Not all pulses nodulate and fix N to their potential
- Raise awareness around research in pulse nodulation and N fixation through creating awareness and running farmer demos
- Look at the impacts of soil acidity on nodulation
- Pulse extension and validation to support expansion of pulses outside the traditional production areas
- Boosting on farm nitrogen fixation workshops – Nhill
25th March 9am – 12pm



What we have looked at

2019

- 1 x replicated trial looking at inoculation rate in Chickpeas
 - TagTeam® Granular
 - Nil treatment
 - Standard 4.9kg/ha treatment
 - Double rate 9.8kg/ha treatment
- 1 x demo (not replicated) looking at TagTeam® peat vs TagTeam® granular.
 - Peat 288g/ha (2.4g / 1kg seed)
 - Granular 4.9kg/ha

2020

- 1 x replicated trial looking at inoculation rate in Lupins
 - TagTeam® Granular
 - Nil treatment
 - Standard 4.9kg/ha treatment
 - Double rate 9.8kg/ha treatment
- 1 x replicated trial looking at inoculation rate + the addition of PPT in Chickpeas
 - Nil treatment
 - Standard 4.9kg/ha treatment
 - Double rate 9.8kg/ha treatment
 - Nil treatment + PPT
 - Standard 4.9kg/ha treatment + PPT
 - Double rate 9.8kg/ha treatment + PPT

What We found

• Paddock Background

Sample	Contact	Location	Other Details	pH _{CaCl2}	Nodule Assessments- BAG SOIL			Nodule Assessments- Water Wells			Cicer	<i>R. leguminosarum</i> viciae
					Chickpea	Lentil/vetch	Lupin	Chickpea	Lentil/vetch	Lupin	kDNA copies/g Sample*	kDNA copies/g Sample*
2020-20	Amanda Pearce	Booi Lagoon	David robertson Pulse trial	4.96	3/3	3/3	0/2	0,0	>10,>10	0,0	13	5
2020-21	Amanda Pearce	Coomandook P	site 2 Pulse 7/3	6.08	0/1	2/2	0/1	0,<5	>10,>10	0,0	0	5

- Bag test – is plants grown in full soil and assessed for nodulation.
- Water well test – Plants grown in sand and inoculated with soil mix (so less sensitive if numbers are low, but can pick up backgrounds in constrained soils)
- DNA Test – Reliable for vetch/bean/lentil (E/F), under development for chickpea (N).

What We found

Chickpeas

Nil Treatment



Standard Rate Treatment



Double Rate Treatment



What We found

Chickpeas

Nil Treatment

Left + PPT / Right - PPT



What We found

Chickpeas

Standard Rate

Left + PPT / Right - PPT



What We found

Chickpeas

Double Rate

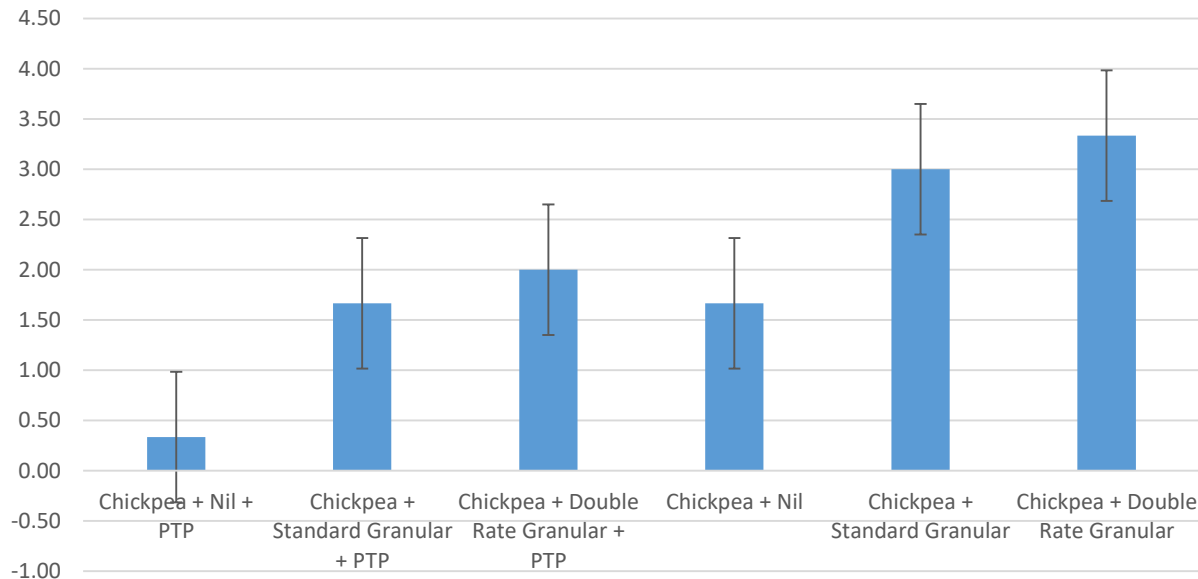
Left + PPT / Right - PPT



What We found

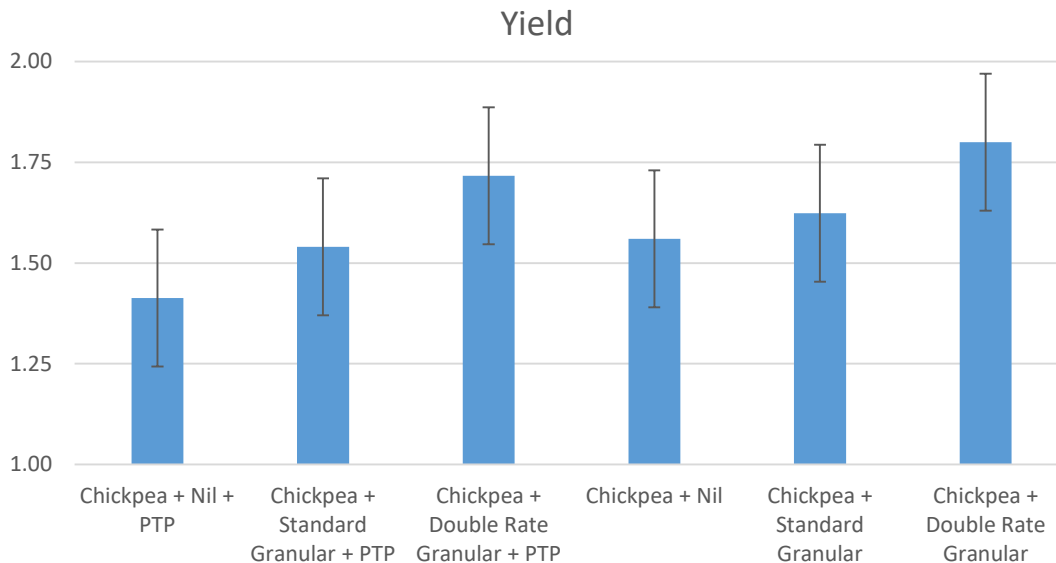
Chickpeas

Nodulation Scores (1-5 scale)



What We found

Chickpeas



No significant differences in grain quality

What We found

LUPINS

Nil Treatment

Standard Rate Treatment

Double Rate Treatment



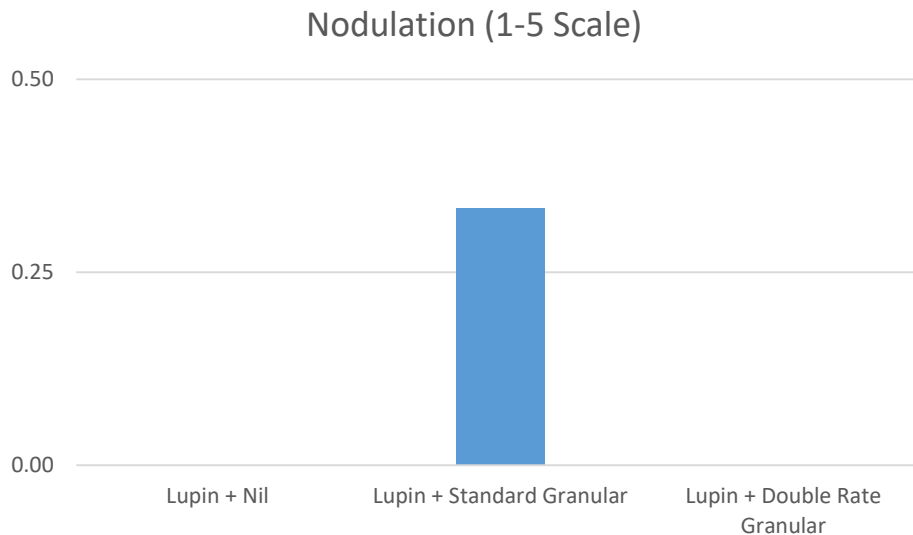
What We found

LUPINS



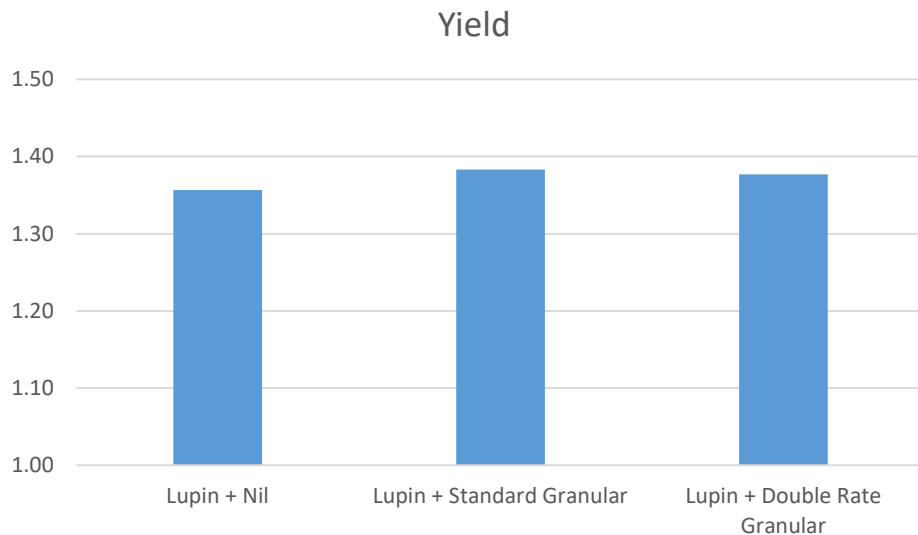
What We found

LUPINS



What We found

LUPINS



What Did We Learn?

- Nodulation and Rhizobia is a numbers game
 - Rhizobia is a living organism
- It is important to check what is happening below the surface
 - No Nodules = No N₂ fixation
- Make sure you are inoculating using the correct inoculum group
 - Group E/F = Field Pea, Vetch, Faba Bean, Lentil
 - Group N = Chickpea
 - Group G/S = Lupin
- We haven't got any data on the level of N Fixation
 - Reference plants in each of the plots
 - Awaiting results from SARDI



What's Next?

- 2020 was the wrap up of both the Southern Pulse Agronomy and Southern Pulse Extension projects, which incorporates the Pulse Check Groups.
- There has been discussions with GRDC about the potential of another pulse project.
- Coomandook has been named as a potential location to host a trial site (if it goes ahead)
 - This is a credit to everyone in the district for showing great support to past projects

Any Questions?

