Trangie

Trangie site attributes
2023

Rainfall

Table 5: *Monthly rainfall in 2023 and long-term average (LTA, 1878–2023), total annual and growing season (GSR, April–October) rainfall at Trangie (Silo PPD).*

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	GSR
2023	42	52	36	55	4	36	26	10	3	18	63	67	412	152
LTA	56	52	47	39	40	42	37	34	34	47	45	46	519	273

Soil characteristics

Sampled May 2023		Soil depth (cm)			
Characteristic	Unit	0–10	10–30	30–60	60–90
pH ($CaCl_2$)		4.7	5.0	5.9	6.2
pH (water)		5.8	6.1	7.1	7.4
Organic Carbon	%	0.9	0.4	0.3	0.2
Electrical conductivity (1:5 water)	dS/m	0.07	0.05	0.03	0.03
Phosphorus (Colwell)	mg/kg	34	12	<5	<5
Sulphur (KCl4O)	mg/kg	5	4	<1	3
Chloride	mg/kg	<10	<10	<10	<10
Nitrate N	mg/kg	17.0	13.0	3.3	1.7
Ammonium N	mg/kg	1.2	<0.6	2.6	1.2
Cation exchange capacity (CEC)	meq/100 g	5.7	6.0	8.9	15.5
Exc. calcium	%	3.7	4.2	5.4	8.7
Exc. magnesium	%	1.0	1.1	2.9	6.2
Exc. potassium	%	1.00	0.75	0.54	0.47
Exc. sodium	%	<0.02	<0.02	0.04	0.17
Soil colour		brown	brown	orange/yellow	orange/yellow
Soil texture		clay	clay	clay	clay

Crop sequence and key management dates

Crop sequence		
Year	Crop	Cultivar
2022		
2021		
2020		

Site management 2023		
Activity	Date	Comments
Sowing	9 May	Main sowing: all species
	7 June	Late sowing: faba beans, lupins, vetch
Harvest	18 October	Field peas, vetch
	1 November	Chickpeas, faba beans, lentils
	15 November	Lupin, canola, wheat

Pulse species comparison

Trangie 2023

Key findings

- Field peas had the highest grain yield of the pulse species evaluated, averaging 2.1 t/ha. APB Bondi(ⓘ) was the standout variety at 2.4 t/ha.
- Albus lupins were the next best pulse, with both Luxor and Murringo yielding 1.8 t/ha.
- Chickpeas were the highest yielding of the high value pulses at 1.5 t/ha, with similar yield for early sown faba beans.
- Lentil yield from machine harvest was ~0.8 t/ha, but a hand cut sample two weeks earlier (mature but not quite ready to harvest) yielded more than double (~1.7 t/ha) the machine harvest. This highlights the potential for lentils, a high value pulse option, the importance of timely harvest, and the challenges of picking up lentils from the ground with the header.
- Field peas had the highest peak biomass (related to N-fix) at 8.6 t/ha, with chickpeas second highest (5.0 t/ha). All other pulse species grew <5 t/ha biomass (measured at 30–50% podding).
- Nitrogen was applied to selected varieties of each species and had little effect on yield or seed nitrogen concentration. The nitrogen application was included to enable a comparison of N-fixation in a high N environment between species.
- Seed nitrogen concentration was highest in albus lupins and lowest in chickpeas. Seed N concentration is important when calculating the nitrogen balance (N-fixation – N removed) of a pulse crop.
- As a comparison with the pulse species, canola yielded 0.5 t/ha and wheat yielded 2.4 t/ha (low N fertility) to 3.4 t/ha (high N fertility).

Trial details

Table 6: *Trial management details for pulse species and variety comparison at Trangie in 2023.*

Management	2023	
Sowing date	9 May: main sowing – all species 7 June: late sowing – lupins, vetch, faba beans only	
Starter fertiliser	MAP @ 75 kg/ha, in furrow	
Harvest date	18 October: field peas, vetch 1 November: chickpeas, faba beans, lentils 15 November: lupins, canola, wheat	
Target plant population	Chickpeas: 35 plants/m^2 Faba beans: 20 plants/m^2 Field peas: 40 plants/m^2 Lentils: 110 plants/m^2	Lupins: 35 plants/m^2 Vetch: 35 plants/m^2 Canola: 30 plants/m^2 Wheat: 120 plants/m^2

Table 7: *Treatments included in pulse species and variety comparison at Trangie in 2023.*

Species Variety	Sowing time*	Additional management	Nitrogen rate** (kg N/ha)
Canola			
HyTTec® Trophy	Main	Decile 2 N	0
	Main	Decile 6 N	37
	Main	Decile 8 N	65
Faba beans			
PBA Samira$^{\Phi}$	Main		0
	Main	+N	100
	Late		0
PBA Nasma$^{\Phi}$	Main		0
FBA Ayla$^{\Phi}$	Main		0
Lupins			
PBA Bateman$^{\Phi}$ (narrowleaf)	Main		0
	Late		0
Murringo$^{\Phi}$ (albus)	Main		0
Luxor$^{\Phi}$ (albus)	Main		0
	Main	+N	100
	Late		0
Vetch			
Studenica$^{\Phi}$	Main	Hay	0
	Main	Brown manure	0
	Main		0
	Main	+N	100
	Late		0

Species variety	Sowing time*	Additional management	Nitrogen rate (kg N/ha)
Field peas			
PBA Butler$^{\Phi}$	Main		0
	Main	+N	100
PBA Taylor$^{\Phi}$	Main		0
APB Bondi$^{\Phi}$	Main		0
Chickpeas			
CBA Captain$^{\Phi}$	Main		0
	Main	+N	100
PBA HatTrick$^{\Phi}$	Main		0
PBA Seamer$^{\Phi}$	Main		0
Lentils			
PBA Hallmark XT$^{\Phi}$	Main		0
CIPAL 2122	Main		0
PBA Kelpie XT$^{\Phi}$	Main		0
	Main	+N	100
Wheat			
LongReach Mustang$^{\Phi}$	Main	Decile 2 N	0
	Main	Decile 6 N	17
	Main	Decile 8 N	77

* Main sowing time: 9 May
Late sowing time: 7 June
** Nitrogen applied as urea incorporated by sowing

Pulse species and variety comparison, plus wheat and canola at Trangie in 2023

Table 8: *Peak biomass, grain yield and seed N concentration of six pulse species plus wheat and canola at Trangie in 2023.*

Species	Variety	Sowing time	N applied (kg/ha)	Peak biomass (t/ha)	Grain yield (t/ha)	Seed N concentration (%)
Canola	HyTTec Trophy	Main	0	2.0	0.4	–
	HyTTec Trophy	Main	37	–	0.5	–
	HyTTec Trophy	Main	65	–	0.6	–
Chickpeas	CBA Captain	Main	100	5.5	1.6	3.4
	CBA Captain	Main	0	4.5	1.5	3.3
	PBA Drummond	Main	0	–	1.7	–
	PBA Seamer	Main	0	–	1.4	–
Faba beans	FBA Ayla	Main	0	–	1.6	–
	PBA Nasma	Main	0	–	1.7	–
	PBA Samira	Main	100	6.4	1.4	4.1
	PBA Samira	Main	0	4.7	1.3	4.2
	PBA Samira	Late	0	2.4	0.5	3.8
Field peas	APB Bondi	Main	0	–	2.4	3.9
	PBA Butler	Main	100	8.6	1.8	4.0
	PBA Butler	Main	0	8.7	2.0	4.0
	PBA Taylor	Main	0	–	2.2	4.1
Lentils	Cipal 2122	Main	0	–	1.0	–
	PBA Hallmark XT	Main	0	–	0.8	–
	PBA Kelpie XT	Main	100	4.5	0.8	4.3
	PBA Kelpie XT	Main	0	3.5	0.7	4.2
Lupins	Luxor	Main	100	7.0	1.8	5.9
	Luxor	Main	0	6.5	1.8	5.9
	Murringo	Main	0	–	2.2	–
	Luxor	Late	0	3.7	1.0	5.9
	PBA Bateman	Main	0	1.7	0.4	5.6
Vetch (grain)	Studenica	Main	100	6.2	1.1	5.0
	Studenica	Main	0	5.9	1.1	4.8
	Studenica	Late	0	2.3	0.2	3.9
Wheat	LRPB Mustang	Main	0	–	2.4	–
	LRPB Mustang	Main	17	–	2.7	–
	LRPB Mustang	Main	77	–	3.4	–
			l.s.d. (P = 0.05)	1.7	0.2	0.2

Table 9: *Comparison of lentil yield from hand harvest versus machine harvest at Trangie in 2023.*

Variety	Nitrogen treatment	Grain yield (t/ha)	
		Hand harvest 18 October	Machine harvest 1 November
Cipal2122	Nil	0.95	1.76
PBA Hallmark XT	Nil	0.77	1.58
PBA Kelpie XT	+N	0.76	1.61
PBA Kelpie XT	Nil	0.77	1.73

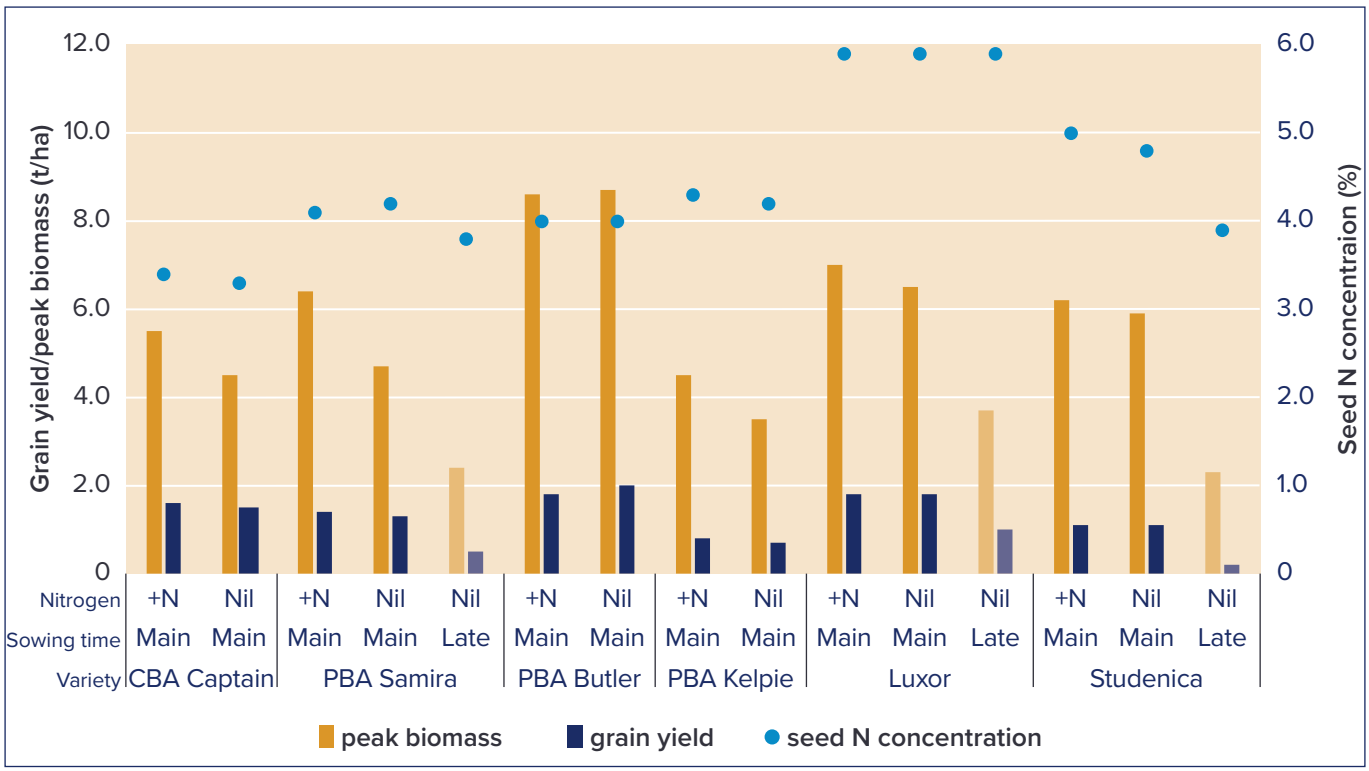

Figure 3: *Peak biomass, grain yield and seed nitrogen concentration of one variety of each pulse species evaluated at main and late sowing time (faba beans, albus lupin and vetch) and +N treatment at Trangie in 2023.*