Trial 1. Canola nutrition trial (FAR NSW C23-01)

Objectives: To determine the canola yield response to N, P, K & S in HYC environments, and to determine the factors driving the positive yield response observed from applying chicken manure to canola in HYC trials in previous seasons.

Key points:

- *Canola yield response to N application plateaued at 3.7 t/ha with 150 kg N/ha applied, 0.6 t/ha higher than where nil N was applied.*
- *The addition of 3 t/ha (dry basis) Chicken Manure (see analysis Table 3) with nil N had no impact on grain yield but did increase yield when applied with the 225 kg N/ha rate, yielding 0.4 t/ha more than 225 kg N/ha alone.*
- *Although the manure supplied ~105 kg N/ha, the lack of response where no N as urea was applied suggests that this N may not be readily available to the crop.*
- *The Inorganic Nutrient treatment (NPKS in inorganic fertiliser equivalent to 3 t/ha chicken manure) applied with 225 kg N/ha yielded similarly to where Chicken Manure was applied with 225 kg N/ha.*
- *Where the macro-nutrients N, P, K & S were sequentially dropped out of the Inorganic Nutrition treatment, the only one that affected yield was the subtraction of P. Dropping P out reduced yield by 0.4 t/ha compared with where both 3 t/ha Chicken Manure and the Inorganic Nutrient equivalent were applied with 225 kg N/ha.*
- *This response to P comes even where there was 15 kg P/ha applied pre-sowing (as single super) and 28 kg /ha P applied at sowing (as MAP).*
- *Further work determining optimum P levels is required for canola yields > 4 t/ha. Potentially growers should aim to increase their soil P reserves gradually over time (similar to N bank approach) to increase yield potential in high yielding situations.*

Treatments (12):

- Nitrogen application rates from nil to 300 kg N/ha (5 treatments). Nitrogen application split between 6 leaf and bud visible stage.
- 3 t/ha Chicken manure applied at the Nil N and 225 kg N/ha rate (2 treatments). Chicken manure broadcast immediately before sowing.
- Inorganic Nutrients (equivalent NPKS as Chicken Manure) applied with the 225 kg N/ha rate (1 treatment). Inorganic Nutrients (as MAP, Urea, Single Super and Potash) broadcast immediately pre-sowing.
- Subtraction of the N, P, K & S components from the Inorganic Nutrients treatment, to determine the nutrient driving yield response (4 treatments).

Table 1. Grain yield, oil and protein concentration of 45Y95 CL canola with 12 different nutrition levels at Wallendbeen NSW, 2023.

Treatment		Grain yield (t/ha)	Oil (%)	Protein (%)
1	Nil N	3.1	47.7	16.5
2	75 kg N/ha	3.5	46.8	17.5
3	150 kg N/ha	3.7	45.8	18.8
4	225 kg N/ha	3.8	45.5	19.5
5	300 kg N/ha	3.8	44.9	20.2
6	Nil N + 3 t/ha Chicken Manure*	3.2	47.7	16.5
7	225 kg N/ha + 3 t/ha Chicken Manure*	4.2	45.2	19.8
8	225 kg N/ha + Inorganic Nutrients	4.2	44.8	20.6
9	225 kg N/ha + Inorganic Nutrients – K	4.1	45.6	19.4
10	225 kg N/ha + Inorganic Nutrients – N	4.2	45.2	19.8
11	225 kg N/ha + Inorganic Nutrients – P	3.8	44.6	20.6
12	225 kg N/ha + Inorganic Nutrients – S	4.3	44.7	20.6
LSD (P=0.05)		0.22	0.60	0.80
P Value		<0.001	0.002	<0.001

*Dry basis. See 'Appendix. HYC Canola NSW Crop Technology Centre' for detailed nutrient analysis of chicken manure.

Inorganic Nutrients: Application of inorganic fertiliser (Urea, single super, potash, MAP) to the equivalent NPKS rates supplied by 3 t/ha chicken manure.

Table 2. Nutrition treatments applied to 45Y95 CL canola at Wallendbeen, NSW 2023

		27-Apr				3-Jun	18-Aug
Treatments	**Manure***	**K**	**N**	**P**	**S**	**6-Leaf N**	**Bud Visible N**
Nil	0	0	13	43	20	0	0
75 kg N/ha	0	0	13	43	20	37.5	37.5
150 kg N/ha	0	0	13	43	20	75	75
225 kg N/ha	0	0	13	43	20	112.5	112.5
300 kg N/ha	0	0	13	43	20	150	150
Nil N + 3 t/ha Chicken Manure	3 t/ha	0	13	43	20	0	0
225 kg N/ha + 3 t/ha Chicken Manure	3 t/ha	0	13	43	20	112.5	112.5
225 kg N/ha + Inorganic Nutrients†	0	54	118	97	35	112.5	112.5
225 kg N/ha + Inorganic Nutrients – K	0	*0*	118	97	35	112.5	112.5
225 kg N/ha + Inorganic Nutrients – N	0	54	*13*	97	35	112.5	112.5
225 kg N/ha + Inorganic Nutrients – P	0	54	118	*43*	35	112.5	112.5
225 kg N/ha + Inorganic Nutrients – S	0	54	118	97	*20*	112.5	112.5

*Manure rate reported on a dry matter basis.

†Inorganic nutrients were broadcast pre-sowing.

Table 3. Trial management details of Canola nutrition trial at Wallendbeen, 2023

Sowing Date		**27 April 2023**
Variety		45Y95 CL
Sowing Rate:		Target 40 plants/m²
Seed Treatment:		Saltro Duo
Basal Fertiliser:	27 Apr	170 kg/ha Single Super (Broadcast pre-sow)
		130 kg/ha MAP (1 cm below seed)
		(13 kg N/ha, 28 kg P/ha)
Nitrogen:	3 Jun	112.5 kg N/ha (245 kg/ha urea)
	18 Aug	112.5 kg N/ha (245 kg/ha urea)
Fungicide:	1 Jun	Prosaro 0.45 L/ha
	4 Sep	Aviator Xpro 0.8 L/ha

Table 4. Active ingredients and chemical loading (g/L) for products used.

Name	**Active 1**		**Active 2**		**Type**
Fungicide					
Aviator Xpro	Prothioconazole	150 g/L	Bixafen	75 g/L	EC
Prosaro	Prothioconazole	210 g/L	Tebuconazole	210 g/L	SC
Saltro Duo	Pydiflumetofen	200 g/L	---	---	FS