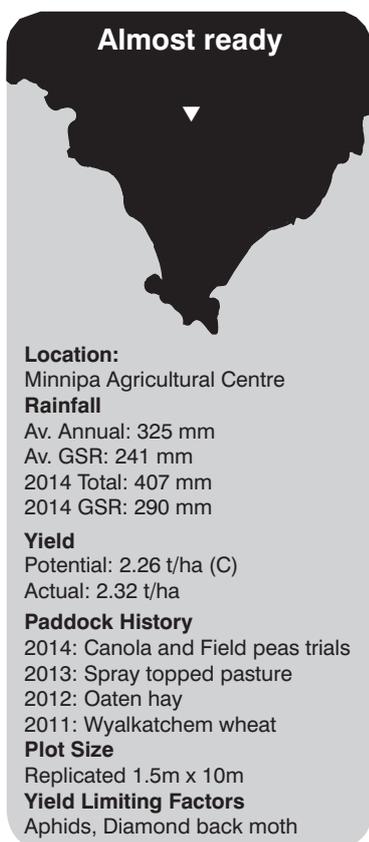


# Maximising canola yield by getting establishment right – upper EP experience in 2014

RESEARCH

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- **Achieving approximately 50 plants/m<sup>2</sup> of triazine tolerant varieties and 40 plants/m<sup>2</sup> of Clearfield tolerant varieties was needed to maximise canola yields in trials conducted at Minnipa Agricultural Centre in 2014.**
- **Using farmer retained open pollinated seed did not cause a yield penalty when compared to commercially purchased seed in trials conducted at Minnipa in 2014.**

**Treatments:** Sowing dates: Time of Sowing (TOS) 1: 15 April 2014, TOS2: 30 April 2014, TOS3: 13 May 2014, TOS4: 29 May 2014. Two varieties were sown each time: ATR Stingray (open pollinated) and Hyola 559TT (hybrid). Sowing depths of, Normal (2 cm) and Deep (4 cm). Sowing rates: 40 plants/m<sup>2</sup> (equivalent to 1.8 kg/ha Stingray and 1.7 kg/ha Hyola 559TT) and 60 plants/m<sup>2</sup> (equivalent to 2.7 kg/ha Stingray and 2.6 kg/ha Hyola 559TT). Seed size: Stingray = 0.32 g/100 seeds and Hyola559TT = 0.37 g/100 seeds.

## Why do the trial?

This is a South Australian Grains Industry Trust (SAGIT) funded project. It aims to maximise canola productivity through creating soil specific management strategies that improve canola yields, profitability and establishment in field trials on lower and upper Eyre Peninsula (EP).

**Management:** The trial received a total of 71 kg/ha 19:13:0 S9% + 63 kg/ha Urea fertiliser, applied at seeding and a further 81 kg/ha of Urea and 168 kg/ha Sulphate of Ammonia (SOA) broadcast during the season (total of 113 kg/ha of nitrogen). 1 L/ha Atrazine (500g/L a.i), 250 ml/ha Select, 250 ml/ha Targa and 1% Kwicken was applied to control weeds. Multiple products were used during the season to control insects, which included aphids and diamond back moth.

In 2014, ten separate trials were conducted as part of this project at Minnipa Agricultural Centre, and Piednippie on upper EP. Four trials will be reported in this article but only from Minnipa Ag Centre trials, as the Piednippie trial site was too variable. Further trials were conducted on lower EP and will be reported in the LEADA results booklet.

## How was it done?

**Trial 1 – Time of Sowing** (Minnipa Agricultural Centre)

**Aim:** To evaluate the effect of four different sowing times, in combination with two different seeding depths and two different seeding rates has on canola emergence and yield of two triazine tolerant varieties on Minnipa Agricultural Centre.

## Key messages

- **Early sowing (15 April) had the largest positive impact on canola yield when comparing a range of treatments trialled in 2014, similar to results observed in 2013. Sowing on 15 April improved yields up to 45%, depending on variety, compared to 13 May sowing date.**
- **Good seeding depth and the correct seed rate proved important in maximising canola yield at the sites trialled in 2014, but not to the same extent as time of sowing. Sowing at 4.5 kg/ha at a 2 cm depth gave a 13% yield improvement over sowing at 1.5 kg/ha at 1 cm depth.**

**Table 1 Grain yield (t/ha) for ATR Stingray and Hyola 559TT with four sowing times at Minnipa in 2014**

Variety	TOS1	TOS2	TOS3	TOS4
ATR Stingray	2.25	1.59	1.22	0.34
Hyola 559	1.69	1.50	1.11	0.44
LSD ( $P=0.05$ )	0.09			
CV (%)	10			

**Table 2 50% flowering date (start of flowering) for ATR Stingray and Hyola 559TT sown at two seeding rates (40 and 60 plants/m<sup>2</sup>); at 2 cm deep, over four sowing times at Minnipa in 2014**

Variety	Rate TOS	50% Start of flowering dates	
		40	60
ATR Stingray	TOS1	9 Jul	8 Jul
	TOS2	30 Jul	30 Jul
	TOS3	19 Aug	19 Aug
	TOS4	6 Sep	6 Sep
Hyola 559TT	TOS1	31 Jul	29 Jul
	TOS2	10 Aug	10 Aug
	TOS3	28 Aug	27 Aug
	TOS4	06 Sep	06 Sep

**Table 3 Grain yield and establishment rates for ATR Stingray and Hyola 559TT sown over four sowing times at Minnipa in 2014 at 2 and 4 cm sowing depths**

Variety	Rate TOS/ Depth	Grain yield (t/ha)				Emergence (plants/m <sup>2</sup> )			
		40		60		40		60	
		4 cm	2 cm	4 cm	2 cm	4 cm	2 cm	4 cm	2 cm
ATR Stingray	TOS1	2.32	2.12	2.20	2.34	27	39	36	43
	TOS2	1.54	1.62	1.52	1.69	16	38	35	43
	TOS3	1.09	1.26	1.18	1.35	14	40	26	49
	TOS4	0.30	0.34	0.35	0.36	6	13	9	24
Hyola 559TT	TOS1	1.73	1.63	1.69	1.71	23	30	45	45
	TOS2	1.44	1.51	1.53	1.51	22	36	35	47
	TOS3	1.03	1.12	1.14	1.14	23	32	26	45
	TOS4	0.41	0.43	0.42	0.52	7	26	15	29
LSD ( $P=0.05\%$ )	TOS x rate x depth	0.18				10			
CV (%)		10							

## What does this mean?

- Time of sowing had a large impact on yield, where the earliest sowing time produced the highest yield and each subsequent time of sowing producing significantly lower yields.
- There was no penalty from seeding an early maturing variety such as ATR-Stingray in mid-April in 2014 i.e. it managed to utilise the soil moisture available very effectively, and didn't appear to be affected too greatly by early season frosts.
- The first three times of sowing had similar establishment rates (TOS1: 36, TOS2: 34, and TOS3: 32 plants/m<sup>2</sup>, irrespective of variety, sowing depth and seeding rate), but establishment was almost reduced by half (TOS4: 16 plants/ m<sup>2</sup>) for the final time of sowing.
- From this it can be deduced that while establishment can be significantly affected by time of sowing (TOS4 and data collected from a similar trial in

2013) for the majority of the 2014 seeding window (mid-April – mid-May) conditions were suitable to achieve good establishment rates and that the differences observed in yields from different seeding dates were more due to factors other than establishment, such as physiological development.

- Other treatments such as sowing depth and seeding rate while significantly affecting establishment, did not in general terms significantly affect grain yield within the same time of sowing (i.e. all treatments sown on the same day, regardless of sowing rate and sowing depth didn't yield significantly different to each other.)
- A similar trial was established in the high rainfall zone of lower EP, near Wanilla, and similar results were achieved.

### Trial 2 – Triazine Tolerant Canola Emergence Trial

**Aim:** To evaluate the effect of two triazine tolerant varieties, sown at three different seeding rates

and three different depths has on emergence and yield at Minnipa Agricultural Centre.

**Treatments:** The trial was sown on the 6 May 2014. The varieties ATR Stingray, a small seeded open pollinated variety, (seed size 0.32 g/100 seeds) and Hyola 450TT, a large seeded hybrid variety, (seed size 0.52 g/100 seeds) were used in all treatments. The trial was planted at three depths (1 cm, 2 cm, and 4 cm) and at three rates (1.5 kg/ha, 3 kg/ha and 4.5 kg/ha).

**Management:** This trial received a total of 71 kg/ha 19:13:0 S9% and 39 kg/ha Urea fertiliser, applied at seeding and 73kg/ha of Urea and 168 kg/ha SOA broadcast during the season (total of 110 kg/ha nitrogen). The trial received knockdown of Roundup, plus 60 ml/ha Hammer and a bare earth insecticide of 1L/ha Chlorpyrifos. 650 ml/ha Terbyne Extreme, 400 ml/ha Targa was applied to control weeds. Multiple products were used during the season to control insects, which included aphids and diamond back moth.

**Table 4 Grain yield and establishment rates for ATR Stingray, and Hyola 450TT sown at Minnipa in 2014 at 2 and 4 cm sowing depths**

Variety	Rate (kg/ha)	Grain yield (t/ha)			Emergence (plants/m <sup>2</sup> )		
		1 cm	2 cm	4 cm	1 cm	2 cm	4 cm
Hyola 450TT	1.5	1.34	1.31	1.40	17	19	23
	3	1.39	1.36	1.48	32	47	40
	4.5	1.38	1.56	1.50	63	58	50
ATR Stingray	1.5	1.53	1.49	1.44	38	32	34
	3	1.70	1.72	1.66	58	65	52
	4.5	1.62	1.76	1.75	71	70	76
LSD (P=0.05%)	depth x rate	0.14			7		
CV (%)		8.1					

### What does this mean?

- The highest yielding treatments were sown at 3 and 4.5 kg/ha, this gave significantly higher yields than treatments sown at 1.5 kg/ha.
- Sowing depth (seed sown at 1 cm, 2 cm or 4 cm) did not have a significant effect on yield Minnipa in 2014.
- Results from both of these trials indicate that low plant numbers can have a significant detrimental effect on yield and also suggests that growers should target an establishment rate of at least 50 plants/m<sup>2</sup> to maximise yield.
- Results from similar trials sown on sandier soils (Piednippie and Vanilla) conducted in

2014, but not reported here, show that seed placement is more important on sandier soils. Sowing at 4 cm deep significantly reduced yields compared to 2 cm.

### Trial 3 – Clearfield Tolerant Canola Emergence Trial

**Aim:** To evaluate the effects of seed source, sowing depth and seeding rate on Clearfield canola emergence and yield at Minnipa Agricultural Centre.

**Treatments:** This trial was sown on the 6 May 2014. The varieties used in this trial consisted of open pollinated Pioneer 43C80 (seed size 0.43 g/100 seeds) and hybrid Pioneer 43Y85 (0.62 g/100 seeds). The trial was planted at three depths (1 cm, 2 cm, and 4 cm) and

at three rates (1.5 kg/ha, 3 kg/ha and 4.5 kg/ha).

**Management:** This trial received a total of 71 kg/ha 19:13:0 S9% and 39 kg/ha Urea fertiliser, applied at seeding and 73 kg/ha of Urea and 168 kg/ha SOA broadcast during the season (total of 110 kg/ha nitrogen). The trial received knockdown of Roundup, plus 60 ml/ha Hammer and a bare earth insecticide of 1 L/ha Chlorpyrifos. 650ml/ha Intervix, 400 ml/ha Targa was applied to control weeds. Multiple products were used during the season to control insects, which included aphids and diamond back moth.

**Table 5 Grain yield and establishment rates for Pioneer 43C80 and Pioneer 43Y85 sown at Minnipa in 2014 at 2 and 4 cm sowing depths**

Variety	Rate (kg/ha)	Grain yield (t/ha)			Emergence (plants/m <sup>2</sup> )		
		1 cm	2 cm	4 cm	1 cm	2 cm	4 cm
43C80	1.5	1.32	1.27	1.36	31	36	28
	3	1.48	1.38	1.40	47	46	48
	4.5	1.45	1.45	1.46	62	69	49
43Y85	1.5	1.32	1.18	1.24	27	20	22
	3	1.49	1.44	1.42	41	32	29
	4.5	1.43	1.51	1.40	47	58	42
LSD (P=0.05%)	depth x rate	0.07			6		
CV (%)		4.7					

**Table 6 Grain yield and establishment rates for farmer retained Pioneer 43C80CL (graded large and small) and store purchased 43C80 sown at Minnipa in 2014**

Rate (kg/ha)	Grain yield (t/ha)				Emergence (plants/m <sup>2</sup> )			
	1.5		4.5		1.5		4.5	
Size/depth	Deep	Shallow	Deep	Shallow	Deep	Shallow	Deep	Shallow
Large	1.23	1.26	1.49	1.44	35	20	41	59
Small	1.27	1.37	1.44	1.49	17	47	39	66
Store	1.28	1.40	1.51	1.48	24	30	57	72
LSD (P=0.05%)	0.12				11			
CV (%)	5.1							

### What does this mean?

- The lightest seeding rate (1.5 kg/ha) yielded lower than the heavier rates (3 and 4.5 k/ha) for both varieties. Establishment rates were significantly lower in these treatments.
- Sowing depth (seed sown at 1, 2 or 4 cm) did not have a significant effect on yield Minnipa in 2014.
- Results from this trial indicates that sowing canola too thin can have a significant detrimental effect on yield and also suggests that growers should target an establishment rate of at least 40 plants/m<sup>2</sup> to maximise yield.

### Trial 4 – Retained Clearfield Tolerant Seed Trial

**Aim:** To evaluate the effect of retaining seed on yield and establishment of Clearfield canola at Minnipa Agricultural Centre when sown at two different rates and two different depths.

**Treatments:** This trial was sown on the 6 May 2014. The variety used in this trial was open pollinated, Pioneer 43C80. The

seed came from commercially purchased seed (store) (seed size 0.43 g/100 seeds), retained seed graded smaller than 2 mm (small) (seed size 0.33 g/100 seeds) and retained seed graded larger than 2 mm (large) (seed size 0.44 g/100 seeds). The trial was planted at two depths (2 cm and 4 cm) and at two rates (1.5 kg/ha and 4.5 kg/ha).

**Management:** This trial received a total of 71 kg/ha 19:13:0 S9% and 39 kg/ha Urea fertiliser, applied at seeding and 73 kg/ha of urea and 168 kg/ha SOA broadcast during the season (total of 110 kg/ha nitrogen). The trial received knockdown of Roundup, plus 60 ml/ha Hammer and a bare earth insecticide of 1 L/ha Chlorpyrifos. 650 ml/ha Intervix, 400 ml/ha Targa was applied to control weeds. Multiple products were used during the season to control insects, which included aphids and diamond back moth.

### What does this mean?

- Retaining seed and the size of the seed did not significantly affect yield in this trial. The highest seeding rate produced the highest yields regardless

of seeding depth or seed source.

- This trial again showed that seeding rates need to be sufficient to achieve 40 plants/m<sup>2</sup> in order to maximise yield.
- Similar results were achieved from a trial using retained seed of triazine tolerant variety Pioneer Sturt TT at Minnipa in 2014, but as no commercial seed was available for comparison, full results are not reported here.

### Acknowledgements

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