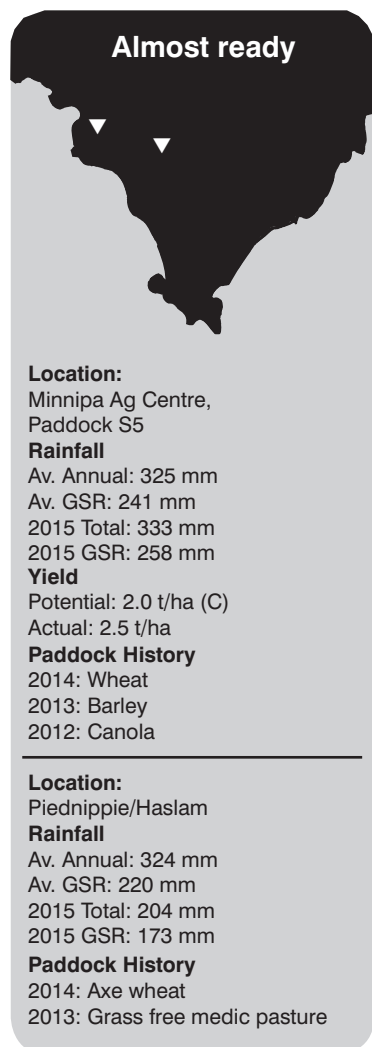


# Maximising canola yield by getting establishment right

Andrew Ware<sup>1</sup>, Leigh Davis<sup>2</sup> and Brenton Spriggs<sup>2</sup>

<sup>1</sup>SARDI, Port Lincoln, <sup>2</sup>SARDI, Minnipa Agriculture Centre

RESEARCH



- Different management practices are needed to establish canola on different soil types under marginal moisture conditions. On a loamy soil at Minnipa deeper sowing (to 4 cm) produced the highest yields, whereas shallower sowing (1 cm) produced the highest yields at Piednippie, particularly with the smaller seeded variety Stingray.
- Trials at Piednippie in 2015 showed that yields up to 0.8 t/ha are achievable in a below average rainfall season, provided the crop is established early and achieves around 50 plants/m<sup>2</sup> in open-pollinated varieties.
- Results from similar trials in 2013, 2014 and 2015 have all shown that the highest yielding canola has consistently come from plots with plant establishments of over 50 plants/m<sup>2</sup> for open pollinated varieties and 40 plants/m<sup>2</sup> for hybrid varieties.

In 2015, seven separate trials were conducted as part of this project at Minnipa Agriculture Centre and Piednippie on upper Eyre Peninsula. Three trials will be reported in this article. Further trials were conducted on lower Eyre Peninsula 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, on canola emergence and yield of two triazine tolerant varieties on Minnipa Agricultural Centre.

**Treatments:** Sowing dates in 2015: Time of Sowing (TOS) 1: 22 April, TOS2: 28 April, TOS3: 18 May, TOS4: 21 May. Two varieties were sown each time: ATR Stingray (open pollinated) and Hyola 559TT (hybrid). Sowing depths were: Normal (2 cm) and Deep (4 cm). Sowing Rates (calculated allowing for an establishment rate of 70% with the small seed Stingray and 85% with the larger seeded Hyola 559TT): 40 plants/m<sup>2</sup> (equivalent to 1.9 kg/ha Stingray and 3.0 kg/ha Hyola 559TT) and 60 plants/m<sup>2</sup> (equivalent to 2.9 kg/ha Stingray and 4.4 kg/ha Hyola 559TT). Seed size: Stingray = 0.34 g/100 seeds and Hyola 559TT = 0.64 g/100 seeds.

## Key messages

- Early sowing (22 April) had the largest positive impact on canola yield when comparing a range of treatments trialled in 2015, similar to results observed in 2013 and 2014. Sowing on 22 April improved yields up to 12%, depending on variety, compared to 29 April sowing date.

## Why do the trial?

The trials described in this article are part of 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 Eyre Peninsula.

**Table 1 Grain yield (t/ha) for ATR Stingray and Hyola 559TT with four sowing times Minnipa in 2015.**

Variety	TOS			
	22 Apr	29 Apr	18 May	21 May
ATR Stingray	2.56	2.28	1.52	1.38
Hyola 559	2.34	2.12	1.43	1.35
LSD ( $P=0.05$ )	0.10			
CV (%)	7.7			

Management: The trial received a total of 69 kg/ha 19:13:0 S9% + 57 kg/ha urea fertiliser, applied at seeding and a further 50 kg/ha of urea and 52 kg/ha sulphate of ammonia broadcast during the season (total of 72 kg/ha of nitrogen). 800 ml/ha Atrazine (500g/l a.i.), 90 ml/ha Verdict and 1.0% Kwicken was applied to control weeds. Multiple products were used during the season to control insects.

### What does this mean?

- Time of sowing had a large impact on yield, where the earliest sowing time (22 April) produced the highest yield and each subsequent time of sowing producing significantly lower yields (Table 1).
- There was no penalty from seeding an early maturing variety such as ATR-Stingray in mid-late April in 2015. It managed to utilise the maximum soil moisture available very effectively, and wasn't compromised by seasonal conditions. A similar result was achieved in 2014.
- TOS 1 and 2 had higher average plant establishment (TOS1: 46 plants/m<sup>2</sup> and TOS 2: 48 plants/m<sup>2</sup>) than times of sowing 3 and 4 (TOS3: 35 plants/m<sup>2</sup> and TOS4: 34 plants/m<sup>2</sup>) (Table 2).

- Interestingly TOS3 and TOS4 were sown three days apart, where TOS3 was sown into relatively dry soil just before 7 mm of rainfall and TOS4 just after. There was no significant difference in plant establishment, but the yield of Stingray was 0.14 t/ha higher in TOS3.
- Other treatments such as sowing depth and seeding rate while significantly affecting plant establishment, did not 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).

### ***Trials 2 & 3 – Triazine Tolerant Canola Emergence Trials***

Aim: To evaluate the effect of two triazine tolerant varieties, sown at three different seeding rates and three different depths, on emergence and yield at Minnipa Agricultural Centre and at Piednippie.

Treatments: The Minnipa trial was sown on 28 April 2015 and the Piednippie trial was sown on 27 April 2015. The varieties; ATR Stingray, a small seeded open pollinated variety, (seed size 0.34 g/100 seeds) and Hyola 559TT, a large seeded hybrid variety,

(seed size 0.63 g/100 seeds) were used in all treatments. The trials were planted at three depths (1 cm, 2 cm, and 4 cm) and at three seeding rates (1.5 kg/ha, 3 kg/ha and 4.5 kg/ha).

Management: The Minnipa trial received a total of 65 kg/ha 19:13:0 S9% and 41 kg/ha urea fertiliser, applied at seeding and 50 kg/ha of urea and 120 kg/ha sulphate of ammonia (SOA) broadcast during the season (total of 78 kg/ha nitrogen). The Piednippie trial received 65 kg/ha 19:13:0 S9% and 41 kg/ha urea fertiliser, applied at seeding and 50 kg/ha urea during the season (total of 54 kg/ha nitrogen). The trials received knockdown herbicide of Sprayseed plus pre-emergent 1.5 L/ha Trifluralin 480 prior to sowing. Multiple applications of insecticides were applied at both sites throughout the season to control a range of insects.

**Table 2 Grain yield and establishment rates for ATR Stingray and Hyola 559TT sown on four sowing times Minnipa in 2015.**

		Grain yield (t/ha)				Emergence (plants/m²)			
Variety	Rate TOS/ Depth	40		60		40		60	
		Deep	Normal	Deep	Normal	Deep	Normal	Deep	Normal
ATR Stingray	TOS1	2.54	2.58	2.49	2.63	33	50	49	71
	TOS2	2.28	2.24	2.35	2.24	39	55	60	71
	TOS3	1.47	1.47	1.54	1.60	25	35	40	50
	TOS4	1.32	1.34	1.43	1.44	27	33	42	43
Hyola 559TT	TOS1	2.31	2.41	2.34	2.32	27	41	33	62
	TOS2	2.06	2.15	2.15	2.14	27	44	42	48
	TOS3	1.39	1.37	1.46	1.49	22	32	31	43
	TOS4	1.28	1.35	1.37	1.40	25	30	31	42
LSD (P=0.05)	TOS x rate x depth	0.18				10			
CV (%)		7.7							

**Table 3 Grain yield and establishment rates for ATR Stingray and Hyola 559TT sown at Minnipa in 2015.**

Variety	Rate (kg/ha)	Grain yield (t/ha)			Emergence (plants/m²)		
		1 cm	2 cm	4 cm	1 cm	2 cm	4 cm
Hyola 559TT	1.5	1.45	1.40	1.43	13	17	16
	3.0	1.47	1.58	1.53	24	30	19
	4.5	1.57	1.67	1.62	42	44	50
ATR Stingray	1.5	1.36	1.46	1.51	23	29	24
	3.0	1.52	1.58	1.62	52	58	50
	4.5	1.56	1.56	1.63	75	78	61
LSD (P=0.05)	depth x rate	0.08			13		
CV (%)		4.8					

**Table 4 Grain yield and establishment rates for ATR Stingray and Hyola 559TT sown at Piednippie in 2015.**

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 559TT	1.5	0.63	0.75	0.57	23	27	14
	3.0	0.75	0.80	0.64	22	56	37
	4.5	0.81	0.81	0.66	60	61	45
ATR Stingray	1.5	0.53	0.66	0.45	28	41	27
	3.0	0.68	0.73	0.53	59	58	30
	4.5	0.69	0.80	0.59	71	74	60
LSD (P=0.05)	depth x rate	0.17			7		
CV (%)		8.1					

**What does this mean?**

The highest yielding treatments were sown at 3.0 kg/ha and 4.5 kg/ha, this gave significantly higher yields than treatments sown at 1.5 kg/ha (Table 3). The cost of 1.5 kg/ha of open pollinated seed is approximately \$18.75/ha, lower if retained on farm, and \$37.50/ha for hybrid varieties (PIRSA Gross Margin Guide 2015). Using a canola price of \$480/t, yields of the open pollinated variety would need to lift from 1.40 t/ha to 1.44 t/ha to cover the expense of an extra 1.5 kg/ha of seed and would need to lift from 1.40 t/ha to 1.48 t/ha to cover the expense of an extra 1.5 kg/ha of hybrid seed.

Sowing 1 cm deep in marginal moisture conditions (almost 10 days after significant rainfall) produced lower yields at Minnipa than treatments sown at 2 cm or 4 cm.

**What does this mean?**

The canola yields from the Piednippie site reached 0.8 t/ha, which given that May, June and July rainfall for this site was Decile 1 (lowest ever) showed that if canola can be established early it is quite hardy and can still offer reasonable returns (Table 4).

On this soil both varieties yielded significantly lower when sown at 4 cm. Sowing depth appeared to be more critical than sowing rate. Seeding to a depth of 2 cm produced the highest yields.

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