Canola establishment on upper Eyre Peninsula

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RESEARCH

Almost ready

Key messages

- **Over three years of field experiments time of sowing was found to be the largest driver of canola yields on upper Eyre Peninsula.**

- **Having suitable soil moisture conditions is critical to achieve optimal canola establishment and to maximise yield.**

Why do the trial?

2017 proved to be a very challenging year to establish canola across Eyre Peninsula. The trials described in this article were part of a South Australian Grains Industry Trust (SAGIT) funded project conducted between 2013-15. It aimed 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. These experiments may help explain observations from poorly established canola planted in the 2017 growing season and may assist to better manage canola establishment into the future.

How was it done?

Between 2013-15 a series of 33 field trials were conducted across a range of soil types and environmental conditions on Eyre Peninsula. These experiments focused on examining the effect that time of sowing had on canola establishment and grain yield. Interactions between canola seeding rate and seeding depth were also examined in separate field trials for their effect on establishment and grain yield.

Further to this, pot experiments were conducted using 20 soils collected across Eyre Peninsula. Rainfall events of differing quantity were applied to pots containing the different soils during April. Canola was planted and establishment was calculated. This helped extrapolate the data gathered from the field experiments across more soil types.

What happened?

Time of sowing

The biggest driver of canola yields in the experiments conducted in 2013-15 at Minnipa was time of sowing, where canola yields declined dramatically with sowing dates after mid-April (Table 1.).

These results highlight the likely poor performance of canola if establishment was delayed until June/July or even August.

Seeding rate and depth

Seeding depth appears to have made a big difference on canola establishment in 2017, where canola that was able to be sown into moisture established far better than where it was sown close to the surface in dry soils. Experiments conducted as part of the SAGIT funded project showed that despite its small seed size, and in the absence of limited soil moisture, canola can establish equally well when sown at 1 cm compared to 4 cm deep (Table 2). This demonstrates that canola can be sown deeper to 'chase' moisture in marginal conditions. These experiments also showed that using higher seeding rates consistently resulted in higher yields.

How much rain is needed to establish canola?

In order to simulate how much rainfall is required to establish canola on a range of soil types across Eyre Peninsula, pot experiments were conducted in autumn growing conditions. Canola establishment was measured at different water inputs, on differing soil types. This showed that heavier, loamy soils (such as those found at Minnipa Agricultural Centre) require at least 15 mm of rainfall to successfully establish canola. Grey calcareous sandy loam soils required similar, whereas sandier soils have a lower rainfall requirement to successfully establish canola (Table 3).

In the period April to July 2017, Minnipa did not receive rainfall totals of 15 mm over three days.

Table 1. Average yields of Minnipa time of sowing (TOS) experiments conducted in 2013, 2014 and 2015.

TOS	Dates	Average yield (t/ha)
TOS 1	15-25 April	1.83
TOS 2	26 April-8 May	1.58
TOS 3	9-18 May	1.26
TOS 4	19-29 May	0.95
LSD (P=0.05)		*0.14*

Minnipa		Large Seed		Small Seed	
		Yield (t/ha)	Emergence (plants/m²)	Yield (t/ha)	Emergence (plants/m²)
Depth	1 cm	1.41	32	1.45	47
	2 cm	1.42	34	1.47	49
	4 cm	1.44	29	1.50	43
LSD (P=0.05)		ns		ns	
Rate	1.5 kg/ha	1.33	17	1.38	28
	3 kg/ha	1.44	31	1.51	49
	4.5 kg/ha	1.50	46	1.54	62
LSD (P=0.05)		0.06		0.06	

Table 2. Average yields of Minnipa canola emergence experiments conducted in 2014 and 2015.

Site	Texture	Rainfall applied (mm)				
		5	7.5	10	15	20
Minnipa I	Loam	0	0	0	65	100
Minnipa II	Loam	0	0	0	95	85
Piednippie I	Sandy Loam (calcareous)	0	0	5	50	95
Piednippie II	Sandy Loam (calcareous)	0	0	0	30	65
Lock	Sandy Loam	0	20	60	70	100
Rudall	Sandy Loam	0	43	78	100	100
Warramboo	Sandy Loam	0	23	43	98	100
Darke Peak	Sand	15	68	95	88	100
LSD (P=0.05)	site x texture	8%				

Table 3. Average establishment percentage of canola planted on different soil types collected across Eyre Peninsula under differing water regimes in grown in pots in April 2015 and 2016.

Break Crops

Table 4. The chance of exceeding rainfall at three locations across South Australia (source CliMate app – Silo).

Location	Chance of >15 mm over three days in April	Chance of >15 mm over three days in May	Chance of >15 mm over three days in April and May
Cummins	40%	64%	78%
Minnipa	25%	48%	58%
Lock	38%	55%	70%

How often does this happen?

In contrast to 2017, in each of the three years the SAGIT Canola Establishment project was conducted there was enough rainfall to get canola established in April. This raises the question, how often does this happen? Using the CliMate app, the chances of getting 15 mm over three days were calculated using historical climate information from Minnipa, Lock and Cummins (Table 4). This showed that the chances of getting enough rainfall to establish canola in April at Minnipa only occurs in 25% of years and in 48% of years in May. This highlights that even with improved seeding technology that may be able to establish canola on lower moisture, there will be a number of years (over a third) where canola is not able to be established in April or May at Minnipa. From the time of sowing experiments, the chances of reaching a successful yield if planted after May are quite low. This highlights the risk of growing canola on upper EP.

What does this mean?

The three years of data collected by this project show that to maximise canola yields, sowing early is critical. These data and previous research conducted at Minnipa found that canola has the potential to be profitable if sown prior to 15 May. However, using historical rainfall records the frequency of years where enough rainfall is received to successfully establish canola during April only occurs in 25% of years at Minnipa, but improves into May.

This may mean that canola may need to be viewed as an opportunity crop on upper Eyre Peninsula and only planted if rainfall is reliably forecast in the following week, or after rainfall events in April or early May and not sown dry with no rainfall forecast.

Acknowledgements

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