Department of Primary Industries

Effect of sowing date on flowering and grain yield of ten canola varieties in a high yielding environment – Wallendbeen 2019

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Key findings

- In 2019, the highest yields came from sowing in late March due to the dry spring conditions and only mild frosts at Wallendbeen.
- Nuseed Diamond was the highest yielding variety from all sowing dates. The highest yield was from the late March sowing date.
- The winter varieties were lower yielding than the spring types, with yields declining from later sowing dates.
- Open pollinated triazine tolerant varieties were generally lower yielding than the hybrid Clearfield® varieties with similar phenology.

Introduction

This experiment was conducted at Wallendbeen, typically a high rainfall area in the South West Slopes, to assess canola's yield potential across different sowing dates in a high yielding environment. Varieties were chosen to represent a diverse range of canola types to compare the different phenologies (including winter types), the breeding type (OP – open pollinated vs hybrid) and herbicide tolerance (TT vs non-TT – triazine tolerant) on three sowing dates: late March, mid April and late April.

This experiment was also conducted at Wallendbeen in 2017 and 2018.

Site details

Location	Wallendbeen (530 m ASL), 15 km north-east of Cootamundra
Soil type	Red ferrosol
Previous crop	Wheat
Rainfall	• Fallow (November 2018–February 2019): 272 mm • In-crop (March 2019–October 2019): 288 mm • In-crop (long-term average): 470 mm
Soil nitrogen	186 kg N/ha (0–180 cm, 27 March)

Treatments

Variety	
Nuseed Diamond	Fast spring hybrid conventional herbicide
Pioneer® 44Y90 (CL)	Mid–fast spring hybrid Clearfield® (CLF)
ATR Bonito$^{\phi}$	Mid–fast spring OP TT
Nuseed Quartz	Mid spring hybrid conventional herbicide
HyTTec Trophy	Mid spring hybrid TT
Pioneer® 45Y91 (CL)	Mid–slow spring hybrid CLF
ATR Wahoo$^{\phi}$	Slow spring OP TT
Archer	Slow spring hybrid CLF
SF Edimax CL	Winter hybrid CLF
Hyola® 970CL	Winter hybrid CLF

This research paper is an extract from the publication *Southern NSW Research Results 2020*, available at https://www.dpi.nsw.gov.au/agriculture/broadacre-crops/guides/publications/southern-nsw-research-results

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Sowing date (SD)	SD1: 28 March SD2: 11 April SD3: 30 April

Results

Seasonal conditions

Wallendbeen had below average rainfall throughout the 2019 growing season, with 288 mm recorded; the long-term average is 470 mm. Frost was not a major issue at Wallendbeen in 2019.

Phenology

Nuseed Diamond was the fastest variety to flower from all three sowing dates; SD3 started flowering close to the optimum date. Nuseed Diamond sown on SD1, flowered in early June, and was at risk of frost damage or upper canopy blackleg disease.

From SD2, HyTTec Trophy, ATR Bonito$^{\phi}$, Nuseed Quartz, Pioneer® 44Y90 (CL), Archer and Pioneer® 45Y91 (CL) all flowered close to or at the optimum start of flowering date.

ATR Wahoo$^{\phi}$ was better suited to SD1, flowering just before the optimum start of flowering date for Wallendbeen.

The winter varieties, SF Edimax CL and Hyola® 970CL, flowered about the same time from each sowing date, reaching the start of flowering well after the optimum start of flower date, exposing them to potentially a higher risk of heat and moisture stress through the critical growth period (Figure 1).

Grain yield

Due to the dry seasonal conditions in 2019 at Wallendbeen, yields were lower than in the project's previous years, e.g. in 2018, Nuseed Diamond sown on 28 March yielded 4.6 t/ha, whereas from the same sowing date in 2019 yielded 3.7 t/ha.

Nuseed Diamond was the highest yielding variety across all sowing dates, despite it being sown at a time (late March/early April) that would normally put it at high risk from frost or disease damage. Nuseed Diamond was also the highest yielding variety from SD2, with 3.3 t/ha. (Table 1).

Nuseed Quartz was the next highest yielding variety, with a yield of 3.4 t/ha from SD1.

Due to the late flowering window for the winter varieties and the dry conditions throughout the year, they were the lowest yielding overall from each sowing date: Hyola® 970CL yielding 1.1 t/ha from SD1 and 0.6 t/ha from SD3. SF Edimax CL was significantly higher yielding at 1.7 t/ha from SD1, but had a similar yield (0.8 t/ha) to Hyola® 970CL from SD3 (Table 1).

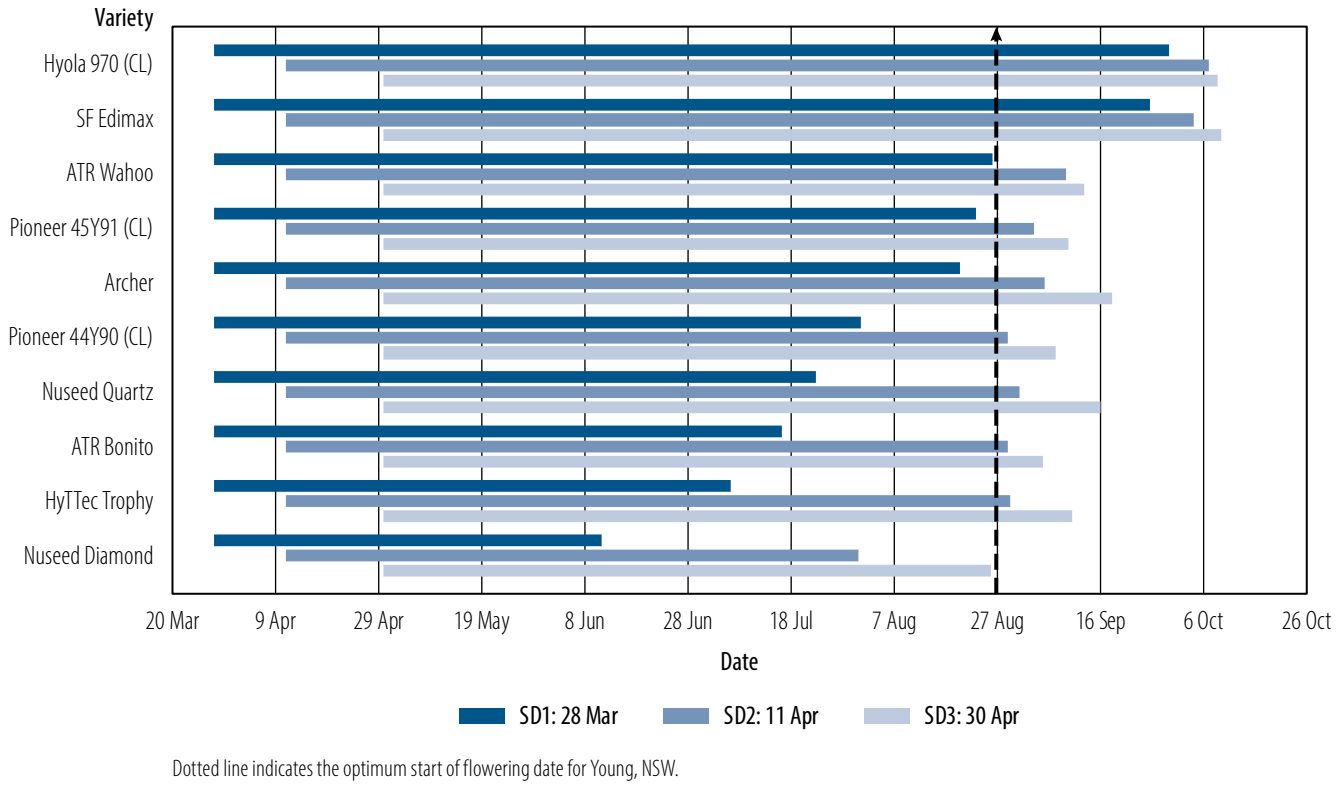
Oil concentration

Nuseed Diamond had the highest oil concentration at 41.8% from SD1. Oil concentrations were very similar within each sowing date between varieties, SD1 yielding the lowest oil concentration for the winter varieties. For the later sowings, oil concentration was reduced for all varieties. The lowest oil concentration was from Nuseed Diamond from SD3 with 36.7% (Table 1).

Table 1 Grain yield (t/ha) and oil concentration (%) of 10 canola varieties sown on three sowing dates at Wallendbeen, 2019.

Variety	Grain yield (t/ha)			Oil concentration (%)*		
	SD1: 28 Mar	SD2: 11 Apr	SD3: 30 Apr	SD1: 28 Mar	SD2: 11 Apr	SD3: 30 Apr
Nuseed Diamond	**3.7**	3.3	2.4	**41.8**	39.5	<u>36.7</u>
HyTTec Trophy	3.2	2.7	2.1	41.0	38.5	37.5
ATR Bonito	2.7	2.2	1.6	41.3	38.8	38.1
Nuseed Quartz	3.4	3.1	2.2	41.2	39.6	36.8
Pioneer 44Y90 (CL)	3.0	2.5	1.7	41.2	40.3	39.1
Archer	2.8	2.7	1.5	41.2	39.8	38.6
Pioneer 45Y91 (CL)	3.3	2.7	1.5	41.7	40.9	39.3
ATR Wahoo	2.4	1.9	1.5	40.7	39.4	39.1
SF Edimax CL	1.7	1.3	0.8	39.6	38.3	37.4
Hyola 970CL	1.1	0.9	<u>0.6</u>	39.2	38.1	37.9
l.s.d. ($P<0.05$)	0.43			1.03		

Values in **bold** indicate the highest value and <u>underlined</u> indicate the lowest for each group.
* Oil concentration is expressed at 6% moisture content.



Dotted line indicates the optimum start of flowering date for Young, NSW.

Figure 1 The start of flowering dates for 10 canola varieties sown on three sowing dates at Wallendbeen, 2019.

Conclusion

Due to the dry season in 2019 and minimal frosts, early flowering favoured higher yields at Wallendbeen. The fast spring variety, Nuseed Diamond was able to achieve the highest yield from SD1, where in a more typical season it would be better suited to a later sowing date. Its high yield in 2019 from SD1 compared with the later sowing dates is in contrast to what has been seen in previous years of this experiment, in particular when the season has a higher incidence of frost as occurred in 2017 when early sown Nuseed Diamond (sown late March) yielded 1.1 t/ha less than the Nuseed Diamond sown on 1 May.

Winter types were not able to reach the same yields as any of the spring types from all sowing dates, which could be due to flowering later than the optimum flowering period. Although the winter varieties did not match the grain yields of the spring varieties, it is important to remember that they are highly profitable as dual-purpose grain and graze varieties.

Acknowledgements

This project was part of the 'High yielding canola' project, BLG107, 2017–20, with joint investment by GRDC and NSW DPI under the Grains Agronomy and Pathology Partnership (GAPP).

Thank you to Cameron and Sarah Hazlett (Wallendbeen) for cooperation with this experiment.