

# Phenology of commercial and new release canola varieties

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# **Key findings**

- Canola varieties varied markedly in the time it took from sowing to the start of flowering.
- Eighteen of 31 varieties started flowering before the optimum start of flowering date for the Wagga Wagga region when sown early on 28 March 2019.
- Thirteen varieties started flowering after the optimum start of flowering date when sown on 26 April 2019.

## Introduction

An important management strategy to maximise yield potential for canola is to sow varieties within the correct sowing window that will allow the variety to flower within the optimum flowering period for a particular location. Flowering too early increases the risk of frost damage, upper canopy blackleg and sclerotinia stem rot infection. Flowering too late increases the risk of damage from heat or moisture stress or both, potentially reducing yield potential.

The optimum start of flowering (determined to be when 50% of the plants have one open flower) differs for each location; for Wagga Wagga it is between 31 July and 23 August, the optimum being around 14 August. To start flowering within this window, a variety's phenology needs to be established so growers can sow varieties in the correct window to achieve flowering during this optimum time.

This experiment examined the phenology of 31 commercial varieties and newly released lines sown on two sowing dates at Wagga Wagga, NSW in 2019.

Site details	Location	Wagga Wagga Agricultural Institute
	Soil type	Red dermosol
	Previous crop	Wheat
	Rainfall	<ul> <li>Fallow (November 2018–March 2019): 259 mm</li> <li>In-crop (April 2019–October 2019): 126 mm</li> <li>In-crop long-term average: 330 mm</li> </ul>
	Soil nitrogen (N)	159 kg N/ha (0–180 cm, 27 March)
Treatments	Variety	Table 1 lists the details of the varieties examined in this experiment.
	Sowing date (SD)	SD1: 28 March SD2: 26 April

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Variety	Phenology	Maturity	Herbicide tolerance*	Plant type
Archer	Slow	Late	CLF	Hybrid
ATR Bonito $^{(\!\!\!\!\ D)}$	Mid–fast	Early	TT	Open pollinated (OP)
ATR Stingray $^{(\!$	Fast	Early	TT	ОР
ATR Wahoo <sup>(†)</sup>	Mid-slow	Mid	TT	ОР
DG670TT	Mid	Mid	RR	Hybrid
GT-53	Mid	Mid	RR	Hybrid
Hyola 350TT	Fast	Early	TT	Hybrid
Hyola 410XX	Mid–fast	Early—mid	Truflex <sup>®</sup> RR	Hybrid
Hyola 530XT	Mid–fast	Mid	Truflex <sup>®</sup> RR/TT	Hybrid
Hyola 550TT	Mid–fast	Mid	TT	Hybrid
Hyola 580CT	Fast	Mid	CLF/TT	Hybrid
HyTTec Trident	Mid–fast	Early	TT	Hybrid
HyTTec Trophy	Mid	Mid	TT	Hybrid
InVigor R 4022P	Mid–fast	Early—mid	RR	Hybrid
InVigor R 5520P	Mid-slow	Mid	RR	Hybrid
InVigor T 3510	Mid–fast	Early	TT	Hybrid
InVigor T 4510	Mid–fast	Early—mid	TT	Hybrid
Nuseed Diamond	Fast	Early	Conventional	Hybrid
Nuseed Quartz	Mid	Early—mid	Conventional	Hybrid
Pioneer® 43Y29 (RR)	Mid–fast	Early	RR	Hybrid
Pioneer® 43Y92 (CL)	Mid–fast	Early	CLF	Hybrid
Pioneer® 44Y27 (RR)	Mid–fast	Early—mid	RR	Hybrid
Pioneer® 44Y90 (CL)	Mid–fast	Early—mid	CLF	Hybrid
Pioneer® 45T03 (TT)	Mid–fast	Mid	TT	Hybrid
Pioneer <sup>®</sup> 45Y91 (CL)	Mid-slow	Mid–late	CLF	Hybrid
Pioneer® 45Y93 (CL)	Mid-slow	Mid	CLF	Hybrid
Saintly CL	Mid–fast	Early	CLF	Hybrid
SF Ignite TT	Mid-slow	Mid–late	TT	Hybrid
SF Spark TT	Fast	Early	TT	Hybrid
Victory V75-03CL	Mid-slow	Mid	CLF	Hybrid
Xseed Raptor	Mid–fast	Early—mid	Truflex <sup>®</sup> RR	Hybrid

Table 1 Details of the varieties examined in the experiment at Wagga Wagga in 2019.

\* CLF = Clearfield<sup>®</sup> (imidazoline tolerant), TT = Triazine tolerant, RR = Roundup Ready<sup>®</sup>.

### Results Seasonal conditions

There was below average rainfall throughout 2019 at Wagga Wagga, with 126 mm falling in the growing season, well below the 330 mm average. Due to the dry conditions towards the end of the season and bird damage, yield data will not be presented here.

Frost was not a major issue at Wagga Wagga in 2019, with 33 days below 0 °C recorded between June and September from a weather station in the paddock: the lowest recorded temperature was -2.8 °C. While 33 days of below 0 °C is nearly double the long-term average of 18 days for Wagga Wagga (recorded at the Wagga Wagga Agricultural Institute weather station) (CliMate, 2020), the minimum temperatures were warmer than those seen in 2017 and 2018, which did cause significant damage to early flowering canola (temperatures below -4 °C). More work will be conducted in 2020 to determine minimum temperature thresholds for canola.

#### Phenology

Nuseed Diamond, Hyola<sup>®</sup> 350TT and Hyola<sup>®</sup> 580CT were the fastest to flower from SD1 with flowering starting in mid July, over a month earlier than the optimum start of flowering for the Wagga Wagga region – the second week in August (shaded area in Figure 1). These varieties flowered up to 58 days earlier from SD1 than SD2. When the start of flowering begins through June and July, it increases the risk of the crop being damaged by frost, upper canopy blackleg infection and sclerotinia stem rot (Figure 1).

Varieties such as Pioneer<sup>®</sup> 43Y29 (CL) and InVigor R 5520P showed a greater level of flexibility in their flowering dates (Figure 1), falling within the optimum flowering period for both sowing dates.

Longer season varieties ATR Wahoo<sup>(b)</sup>, Pioneer<sup>®</sup> 45Y93 (CL), Pioneer<sup>®</sup> 45Y91 (CL), Victory V75-03CL and SF Ignite TT sown in late March started flowering in the optimum window (Figure 1). However, from the more traditional sowing date of 26 April (SD2), they flowered outside this window, increasing the risk of heat and/or moisture stress during their critical growth period (around 350 degree days following start of flowering date) (Kirkegaard et al., 2018).



Optimum start of flowering period for Wagga Wagga is shown as the blue shaded area.

Figure 1 Start of flowering date for each variety sown on two sowing dates at Wagga Wagga, 2019.

Conclusion	Canola varieties differ in their flowering times depending on when they are sown. Sowing a variety too early can lead to flowering when the risks of frost and disease are high; sowing a variety too late can lead to heat or moisture stress.		
	Matching a variety's phenology to its sowing time is critical for flowering to start during the optimum flowering period for that region, which is when environmental and disease risks are balanced for the highest yield potential. More information on sowing windows to suit variety phenology can be found in the DPI's <i>Winter crop variety sowing guide 2020</i> .		
	Previous research has shown that the time from sowing to the start of flowering could be different in any one year in response to temperature and solar radiation.		
	This phenology experiment will be repeated in 2020 with a slightly different variety set, including a number of unreleased lines that are also in the National Variety Trials (NVT).		
References	Kirkegaard JA, Lilley JM, Brill RD, Ware AH and Walela CK, 2018. The critical period for yield and quality determination in Canola ( <i>Brassica napus</i> L.). <i>Field Crops Research</i> , vol. 222, pp. 180–188.		
	CliMate Weather Data https://climateapp.net.au, accessed 19 May 2020.		
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