



SOUTHERN

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GRDC™ GROWNOTES™



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GRAINS RESEARCH
& DEVELOPMENT
CORPORATION

CANOLA

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2.1 Varietal performance and ratings yield

The main features to consider when selecting a variety are maturity, yield, oil content, herbicide tolerance and blackleg resistance. Early-maturing varieties are generally more suited to drier areas, and mid-season types are suited to higher rainfall growing areas.¹

New variety listings for 2015 were:

- Clearfield®—Hyola 970CL, Pioneer 44Y89(CL)
- Triazine-tolerant—Pioneer Atomic TT
- Triazine-tolerant high stability—Monola 515TT
- Roundup Ready®—Hyola 600RR, DG550RR, IH51RR, IH52RR, Pioneer 44Y26(RR), Pioneer 45Y25(RR)
- Roundup Ready® and triazine-tolerant—Hyola 725RT

Varieties removed in 2015:

- Clearfield®—Carbine, Hyola 971CL, Pioneer 43C80(CL)
- Triazine-tolerant—ATR-Snapper, Hyola 656TT, Hyola 555TT, Crusher TT, Thumper TT
- Triazine-tolerant high stability—Monola 413TT
- Roundup Ready®—GT Cobra, GT Viper, Pioneer 45Y22(RR)
- Roundup Ready® and triazine-tolerant—Fusion HT-RR

 More information


¹ L Serafin, J Holland, R Bambach, D McCaffery (2005) Canola: northern NSW planting guide. NSW Department of Primary Industries, <http://www.nvtonline.com.au/wp-content/uploads/2013/03/Crop-Guide-Canola-Northern-NSW-Planting-Guide.pdf>

2.1.1 Varieties for Victoria

For detailed information on varieties available in Victoria in 2015 (Table 1), visit [Agriculture Victoria's Victorian winter crop summary](#).

Table 1: Canola varieties being marketed in Victoria in 2015 ²

Blackleg ratings are from the 2014 GRDC Blackleg Management Guide (revised September 2014); the Australian Oilseeds Federation published updated ratings in March 2015; est, estimate by marketing company (yet to be rated by Australian Oilseeds Federation). R, Resistant; MR, moderately resistant; MS, moderately susceptible; S, susceptible (Jockey® seed dressing contains fluquinconazole). Blackleg resistance group refers to the combinations of blackleg resistance genes carried by each variety.

Variety	Maturity	Year of release	Blackleg resistance rating bare seed	Blackleg resistance rating + Jockey®	Blackleg resistance group	Open pollinated or hybrid	Marketer
Conventional varieties							
AV-Garnet	mid	2007	MR		A	open	Nuseed
AV-Zircon	mid	2011	MR			open	Nuseed
Hyola 50	early-mid	2007	R		A, D	hybrid	Pacific Seeds
Nuseed Diamond	early-mid	2013	R-MR	R-MR	A, B, F	hybrid	Nuseed
SF Brazzil	late	2013	R-MR		B, C	open	Seed Force
SF Sensation	very late	2013	R-MR			hybrid	Seed Force
Conventional high stability							
Victory V3002	early-mid	2011	R-MR	R	A, B, F	hybrid	Cargill/AWB
Herbicide tolerant Clearfield varieties							
Archer	mid	2012	MR-MS	R-MR	A	hybrid	Heritage Seeds
Edimax CL*	Late	2014	R-MR		C	hybrid	AGF Seeds
Hyola 474CL	mid-early	2011	R		B, F	hybrid	Pacific Seeds
Hyola 575CL	mid	2010	R		B, F	hybrid	Pacific Seeds
Hyola 577CL	mid	2013	R	R		hybrid	Pacific Seeds
Hyola 970CL	late	2014	R			hybrid	Pacific Seeds
Pioneer 43Y85(CL)	early	2011	MR	R-MR	A	hybrid	Pioneer Hi-Bred
Pioneer 44C79(CL)	early	2008	MR-MS		C	open	Pioneer Hi-Bred
Pioneer 44Y84(CL)	early- early mid	2010	MS	MR	A	hybrid	Pioneer Hi-Bred
Pioneer 44Y87(CL)	early-mid	2013	MR	R-MR	A	hybrid	Pioneer Hi-Bred
Pioneer 44Y89(CL)	early-mid	2014	R-MR		B, C	hybrid	Pioneer Hi-Bred
Pioneer 45Y86(CL)	mid- mid early	2012	MR-MS	R-MR	AB	hybrid	Pioneer Hi-Bred
Pioneer 45Y88(CL)	mid	2013	R-MR	R-MR	A	hybrid	Pioneer Hi-Bred
Clearfield juncea canola varieties							
XCEED OASIS CL	early	2008	R	G		open	Seednet
Triazine tolerant varieties							
Pioneer Atomic TT	mid	2012	MS	MR	A, B	hybrid	Pioneer Hi-Bred
ATR-Bonito	early- early mid	2013	MR	R-MR	A	open	Nuseed
ATR-Gem	early-mid	2011	MR	R-MR	A	open	Nuseed
ATR-Stingray	early	2011	MR	R	C	open	Nuseed

² Agriculture Victoria (2015) Victorian winter crop summary. 2015 edition. (Ed. K Holloway) Department of Economic Development, Jobs, Transport and Resources Victoria, <http://www.depi.vic.gov.au/agriculture-and-food/grains-and-other-crops/crop-production/victorian-winter-crop-summary>

Variety	Maturity	Year of release	Blackleg resistance rating bare seed	Blackleg resistance rating + Jockey®	Blackleg resistance group	Open pollinated or hybrid	Marketer
ATR-Wahoo	mid	2013	MR	R-MR	A	open	Nuseed
Hyola 450TT	early-mid	2013	R	R	A, B, D	hybrid	Pacific Seeds
Hyola 559TT	mid	2012	R	R	A, B, D	hybrid	Pacific Seeds
Hyola 650TT	mid-late	2013	R	R	A, B, E	hybrid	Pacific Seeds
Pioneer Sturt TT	early	2012	MS	MR		open	Pioneer Hi-Bred
Triazine tolerant high stability varieties							
Monola 314TT	early-mid	2013	MR	R-MR	open		Nuseed
Monola 515TT	mid	2015			open		Nuseed
Monola 605TT	early-mid	2011	R		open		Nuseed
Roundup Ready varieties							
DG 550RR	mid	2014	R-MR	R	A, B	hybrid	Seednet
GT-41	early	2012	R-MR	R-MR	A, B, F	hybrid	Nuseed
GT-50	early-mid	2012	R-MR		A, B, F	hybrid	Nuseed
Hyola 400RR	early-mid	2013	R		A, B, D	hybrid	Pacific Seeds
Hyola 404RR	early-mid	2010	R-MR	R	A, B, D	hybrid	Pacific Seeds
Hyola 500RR	mid	2013	R		A, B, D	hybrid	Pacific Seeds
Hyola 505RR	mid-early	2010	R	R	D	hybrid	Pacific Seeds
Hyola 600RR	mid-late	2014	R-MR (est)	R (est)		hybrid	Pacific Seeds
IH30 RR	early	2013	R-MR	R	A, B	hybrid	Bayer
IH50 RR	mid	2012	R-MR	R	A	hybrid	Bayer
IH51 RR	mid	2014				hybrid	Bayer
IH52 RR	mid	2014	R-MR	R	A, B	hybrid	Bayer
Pioneer 43Y23 (RR)	early	2012	R-MR	R	B	hybrid	Pioneer Hi-Bred
Pioneer 44Y24 (RR)	mid-early	2013	R-MR	R	C	hybrid	Pioneer Hi-Bred
Pioneer 44Y26 (RR)	early-mid	2014	R-MR		A, B, S	hybrid	Pioneer Hi-Bred
Pioneer 45Y25 (RR)	mid	2014	R-MR		B, C	hybrid	Pioneer Hi-Bred
Roundup Ready high stability varieties							
Monola 513GT	mid	2012	MR	R-MR		open	Nuseed
Victory V5002RR	mid	2011	MR	R	A, B	hybrid	Cargill/AWB
Roundup Ready and Triazine Tolerant							
Hyola 525RT	mid	2013	R-MR	R	A, B, D	hybrid	Pacific Seeds
Hyola 725RT	mid-late	2014	R-MR (est)			hybrid	Pacific Seeds

2.1.2 Varieties for South Australia

For detailed information on varieties available in SA in 2015 (Table 2), visit [SARDI's Canola variety sowing guide 2015](#).

Table 2: South Australian mid-season long-term canola yields and agronomic information ³

Data source SARDI/GRDC NVT and District Canola Trials; 2009–13 MET data analysis by National Statistics Program. Oil, Average of 2013 SA midseason NVT trials, adjusted to 6% moisture (number of trials in parentheses). OP, Open-pollinated; Spec. oil, high-stability specialty oil; E, early; M, mid; L, late; R, resistant; MR, moderately resistant; MS, moderately susceptible; S, susceptible (Jockey® seed dressing contains fluquinconazole). Blackleg resistance group refers to the combinations of blackleg resistance genes carried by each variety

Variety	Licensee	Release year	Type [^]	Maturity	Yorke								Oil (%) [*]	Blackleg rating (bare)	Blackleg rating (+jockey)	Blackleg resistance group
					Lower EP		Peninsula		Mid north		South east					
					% of site mean	no. trials	% of site mean	no. trials	% of site mean	no. trials	% of site mean	no. trials				
Conventional																
AV Garnet	Nuseed	2007	OP	M	108	10	106	6	108	8	110	14	46.3 (6)	MR	-	A
AV Zircon	Nuseed	2011	OP	ML	104	6	105	2	104	2	109	8	46.8 (6)	MR	-	unknown
Hyola® 50	Pacific Seeds	2006	Hybrid	M	112	10	114	6	112	8	116	14	46.5 (6)	R	-	AD
Nuseed Diamond	Nuseed	2013	Hybrid	E	113	3	-	-	-	-	-	-	47.0 (3)	R-MR	R-MR	ABF
Victory® V3002	Cargill/AWB	2012	OP - Spec. Oil	M	111	2	-	-	-	-	113	6	46.3 (6)	R-MR	R	ABF
TT Site Mean Yeild (t/ha)					2.09		2.71		2.21		2.17					
Clearfield																
Archer	Heritage Seeds	2012	Hybrid	ML	105	4	106	3	105	11	108	10	44.9 (8)	MR-MS	R-MR	Nil
Carbine	Heritage Seeds	2012	Hybrid	EM	102	4	101	3	103	7	96	6	46.0 (8)	MR-MS	R-MR	A
Hyola® 474CL	Pacific Seeds	2011	Hybrid	ME	102	6	104	3	101	9	109	8	46.3 (8)	R	-	BF
Hyola® 575CL	Pacific Seeds	2010	Hybrid	M	104	8	104	5	103	12	112	11	46.2 (8)	R	-	BF
Hyola® 577CL	Pacific Seeds	2013	Hybrid	M	104	2	-	-	102	2	110	2	46.8 (7)	R	R	unknown
Pioneer® 43Y85 (CL)	DuPont Pioneer	2012	Hybrid	E	96	2	94	2	95	3	95	3	N/A	MR	R-MR	A
Pioneer® 44Y87 (CL)	DuPont Pioneer	2013	Hybrid	EM	104	2	-	-	105	3	100	3	N/A	MR	R-MR	A
Pioneer® 45Y86 (CL)	DuPont Pioneer	2012	Hybrid	M	107	8	108	5	108	12	106	11	46.2 (8)	MR-MS	R-MR	AB
Pioneer® 45Y88 (CL)	DuPont Pioneer	2013	Hybrid	M	108	4	106	2	108	6	110	5	44.4 (8)	R-MR	R-MR	A
Clearfield Site Mean Yeild (t/ ha)					2.11		2.14		2.30		2.8					
Triazine Tolerant																
Atomic HT	NPZ Australia		Hybrid	EM	-	-	102	2	104	6	98	5	44.5 (7)			
ATR Bonito	Nuseed	2013	OP	EM	105	4	98	2	104	6	101	5	47.3 (8)	MR	R-MR	A
ATR Gem	Nuseed	2011	OP	EM	101	6	96	2	100	8	101	7	46.4 (8)	MR	R-MR	A

³ A Ware (2015) SARDI Canola variety sowing guide 2015. Primary Industries and Regions SA, http://www.pir.sa.gov.au/_data/assets/pdf_file/0009/237897/canola.pdf

Variety	Licensee	Release year	Type [^]	Mat- urity	Yorke								Oil (%)*	Blackleg rating (bare)	Blackleg rating (+jockey)	Blackleg resistance group
					Lower EP		Peninsula		Mid north		South east					
					% of site mean	no. trials	% of site mean	no. trials	% of site mean	no. trials	% of site mean	no. trials				
ATR Stingray	Nuseed	2011	OP	E	98	8	94	5	98	12	94	11	46.3 (8)	MR	R	C
ATR Wahoo	Nuseed	2013	OP	ML	101	4	94	2	100	6	101	5	46.3 (8)	MR	R-MR	A
Crusher TT	Pacific Seeds	2010	OP	M	105	8	100	5	104	12	103	11	44.1 (7)	MR-MS		A
Hyola [®] 450TT	Pacific Seeds	2013	Hybrid	ME	103	2	-	-	103	3	107	2	46.9 (8)	R	R	ABD
Hyola [®] 559TT	Pacific Seeds	2012	Hybrid	M	107	5	106	2	107	7	107	5	46.4 (8)	R	R	ABD
Hyola [®] 650TT	Pacific Seeds	2014	Hybrid	ML	-	-	-	-	107	2	-	-	45.9 (4)	R	R	ABE
Hyola [®] 750 TT	Pacific Seeds	2015	Hybrid	L												
Monola [®] 314TT	Nuseed	2014	OP - Spec. Oil	E	87	2	-	-	88	2	82	2	44.0 (7)	MR	R-MR	unknown
Sturt TT	NPZ Australia	2012	OP	E	-	-	92	2	94	7	87	2	43.6 (4)	MS	MR	Nil
Thumper TT	Pacific Seeds	2011	OP	ML	97	8	90	4	94	11	103	11	46.2 (8)	R		E
Triazine Tolerant Site Mean Yeild (t/ha)					1.90		2.5		2.10		1.8					

2.1.3 Oil

Canola was developed from rapeseed to produce an oilseed crop with improved nutritional composition. The aim was to produce a crop that had low levels of glucosinolates in the meal and low levels of erucic acid in the oil.⁴

Oil is extracted by mechanically crushing the seed. The oil is then processed by using heat and/or chemicals. Approximately 73% of canola in Australia is processed by addition of solvents, 25% by expeller treatment and 2% by cold-pressing.

The seed typically has an oil content of 35–45%. The oil content is generally expressed as a percentage of the whole seed at 8% moisture content. The oil contains:

- 10–12% linolenic acid (omega-3)
- <0.1% erucic acid
- 59–62% oleic acid
- 12–22% linoleic acid

Canola oil is high in unsaturated fats (93%) and has no cholesterol or trans-fats. It has the lowest saturated fat content (7%) of any common edible oil.⁵

2.1.4 Seed meal

The seed meal is what is left over after the oil is removed. It contains proteins, carbohydrates, minerals and fibre. The exact composition of seed meal depends on the oil extraction method. The protein content varies each season and increases as the

⁴ R Mailer (2009) Grain quality. In Canola best practice management guide for eastern Australia. (Eds D McCaffrey, T Potter, S Marcroft, F Pritchard) GRDC, http://www.grdc.com.au/uploads/documents/GRDC_Canola_Guide_All_1308091.pdf

⁵ J Edwards, K Hertel (2011) Canola growth and development. PROCROP Series. NSW Department of Primary Industries, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/516181/Procrop-canola-growth-and-development.pdf

oil content decreases. Typically, seed meal consists of 36–39% protein, 1.5–2.0% fat, 11–13% fibre and <10 µmol glucosinolate/g.

The minimum protein content of seed meal, as determined by the AOF (Australian Oilseeds Federation) is 36%, measured at 12% moisture.⁶

2.2 Varieties

2.2.1 Conventional varieties

AV-Garnet: a mid-maturing to mid-early-maturing variety. Medium height. Moderate–high oil content. Widely adapted. Blackleg resistance rating 2014, MR; resistance group A. Tested in NVT trials 2006–14. Bred by Department of Environment and Primary Industries (DEPI) Victoria. Marketed by Nuseed Pty Ltd.

AV-Zircon: a mid-maturing variety. Medium height. Moderate oil content. Blackleg resistance rating 2014, MR; resistance group currently unknown. Tested in NVT trials 2011–14. Bred by DEPI Victoria and Nuseed Pty Ltd. Marketed by Nuseed Pty Ltd.

Hyola® 50: mid-maturing to mid-early-maturing hybrid. High oil content. Widely adapted. Blackleg resistance rating 2014, R; resistance group AD. Tested in NVT trials 2005–14. Bred by Canola Breeders International. Marketed by Pacific Seeds.

Nuseed® Diamond: new release (coded NCH1203C). Early-maturing hybrid. Medium height. High oil content. Suited to low–medium rainfall zones. Blackleg resistance rating 2014, R–MR; resistance group ABF. Tested in NVT trials 2012–14. Bred and marketed by Nuseed Pty Ltd.

SF Brazzil™: late-maturing, winter, dual-purpose, open-pollinated variety. Suited to early sowing and winter grazing in very high-rainfall zones. Blackleg resistance rating 2014, R–MR; resistance group BC. Not tested in NVT trials. Marketed by Seed Force.

SF Sensation™: very late-maturing, winter, dual-purpose hybrid. Suited to early sowing and winter grazing in very high-rainfall zones. Blackleg resistance rating 2014, R–MR; resistance group currently unknown. Not tested in NVT trials. Marketed by Seed Force.

Victory® V3002: early–mid-maturing conventional specialty (high stability oil) hybrid, slightly later than Victory V3001. Moderate–high oil content. Blackleg resistance rating 2014, R–MR; resistance group ABF. Tested in NVT trials 2011–14. Bred by Cargill and DEPI Victoria. Marketed by AWB Ltd in a closed-loop program.⁷

2.2.2 Triazine-tolerant varieties

Triazine-tolerant (TT) varieties can have lower yield and oil content than some Roundup Ready varieties. However, they can give good yields in weedy paddocks, when sprayed with atrazine and/or simazine herbicides.

ATR-Bonito: an early-maturing to early–mid-maturing variety. High–very high oil content. Plant height slightly shorter than ATR-Gem. Blackleg resistance rating 2014, MR; resistance group A. Tested in NVT trials 2012–14. Bred by Nuseed Pty Ltd and DEPI Victoria. Marketed by Nuseed Pty Ltd. An EPR (end-point royalty) applies.

ATR-Gem: a mid-early-maturing variety. High–very high oil content. Slightly shorter plant height than Tawriffic TT. Blackleg resistance rating 2014, MR; resistance group A. Tested in NVT trials 2011–14. Bred by Nuseed Pty Ltd and DEPI Victoria. Marketed by Nuseed Pty Ltd.

⁶ J Edwards, K Hertel (2011) Canola growth and development. PROCROP Series. NSW Department of Primary Industries, http://www.dpi.nsw.gov.au/data/assets/pdf_file/0004/516181/Procrop-canola-growth-and-development.pdf

⁷ Agriculture Victoria (2015) Victorian winter crop summary. 2015 edition. (Ed. K Holloway) Department of Economic Development, Jobs, Transport and Resources Victoria, <http://www.depi.vic.gov.au/agriculture-and-food/grains-and-other-crops/crop-production/victorian-winter-crop-summary>

ATR-Stingray: an early-maturing variety. High oil content. Short plant height. Blackleg resistance rating 2014, MR; resistance group C. Tested in NVT trials 2010–14. Bred by Nuseed Pty Ltd and DEPI Victoria. Marketed by Nuseed Pty Ltd.

ATR-Wahoo: a mid-maturing variety, similar to ATR-Marlin. High–very high oil content. Plant height similar to ATR-Gem. Blackleg resistance rating 2014, MR; resistance group A. Tested in NVT trials 2012–14. Bred by Nuseed Pty Ltd and DEPI Victoria. Marketed by Nuseed Pty Ltd. An EPR applies.

Hyola® 450TT: early-maturing to mid–early-maturing hybrid. High–very high oil content. Medium plant height. Suited to low-rainfall to medium–high-rainfall areas. Blackleg resistance rating 2014, R; resistance group ABD. Tested in NVT trials 2013 and 2014. Bred and marketed by Pacific Seeds.

Hyola® 559TT: mid-maturing to mid–early-maturing hybrid. High oil content. Medium plant height. Suited to medium–very high-rainfall areas. Blackleg resistance rating 2014, R; resistance group ABD. Tested in NVT trials 2012–14. Bred and marketed by Pacific Seeds.

Hyola® 650TT: mid-maturing to mid–late-maturing hybrid. High oil content. Medium–tall plant height. Suited to medium–high-rainfall areas. Blackleg resistance rating 2014, R; resistance group ABE. Tested in NVT trials 2013 and 2014. Bred and marketed by Pacific Seeds

Monola® 314TT: early–mid-maturing, open-pollinated, specialty oil variety. Moderate oil content. Medium plant height. Blackleg resistance rating 2014, MR. Tested in NVT trials 2013 and 2014. Bred and marketed by Nuseed Pty Ltd. Nuseed.

Monola® 515TT: new release (coded NL805). Mid-maturing, open-pollinated specialty oil variety. Moderate–high oil content. No published GRDC blackleg resistance rating or resistance group for 2014. Tested in NVT trials for the first time in 2014. Bred and marketed by Nuseed Pty Ltd.

Pioneer® Sturt TT: early-maturing to early–mid-maturing, open-pollinated variety. Moderate oil content. Short–medium plant height. Adapted to low–medium-rainfall zones. Blackleg resistance rating 2014, MS. Tested in NVT trials 2011–14. Bred by NPZ Australia Pty Ltd. Marketed by DuPont Pioneer. An EPR applies.

Pioneer® Atomic TT: mid-maturing hybrid. Medium height. Moderate oil content. Suited to medium-rainfall zones. Blackleg resistance rating 2014, MS; resistance group AB. Tested in NVT trials 2012–14. Bred by NPZ Australia Pty Ltd. Marketed by DuPont Pioneer.⁸

2.2.3 Clearfield® (imidazolinone-tolerant) varieties

These varieties are tolerant to Intervix® imidazolinone herbicide and are part of the Clearfield® Production System.

Archer: mid–late-maturing hybrid. High oil content. Medium–tall plant height. Blackleg resistance rating 2014, MR–MS. Tested in NVT trials 2011–14. Marketed by Heritage Seeds.

Carbine: early–mid-maturing hybrid. Moderate–high oil content. Medium plant height. Blackleg resistance rating 2014, MR–MS. Tested in NVT trials 2011–13. Marketed by Heritage Seeds.

Hyola® 474CL: mid-maturing to mid–early-maturing hybrid. High oil content. Medium–tall plant height. Suited to medium–low-rainfall to high-rainfall areas. Blackleg resistance rating 2014, R; resistance group BF. Tested in NVT trials 2011–14. Bred and marketed by Pacific Seeds.

⁸ P Matthews, D McCaffery, L Jenkins (2015) Winter crop variety sowing guide 2015. NSW DPI Management Guide. NSW Department of Primary Industries, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0011/272945/winter-crop-variety-sowing-guide-2015.pdf

Hyola® 575CL: mid-maturing hybrid. High–very high oil content. Medium plant height. Suited to medium–very high-rainfall areas. Blackleg resistance rating 2013, R; resistance group BF. Tested in NVT trials 2010–14. Bred and marketed by Pacific Seeds.

Hyola® 577CL: mid-maturing hybrid. High–very high oil content. Medium–tall plant height. Suited to medium–high-rainfall areas. Blackleg resistance rating 2014, R. Tested in NVT trials 2013 and 2014. Bred and marketed by Pacific Seeds.

Hyola® 970CL: late-maturing, winter graze and grain hybrid. Pacific Seeds indicate high–very high biomass, good grain yield and oil content. Early–mid autumn and spring sowing, graze and grain option for very high-rainfall zones. No published GRDC blackleg resistance rating or resistance group for 2014. Released 2014. Not tested in NVT trials. Bred and marketed by Pacific Seeds.

Hyola® 971CL: late maturing, winter graze and grain hybrid. Pacific Seeds indicate high–very high biomass, good grain yield and oil content. Early–mid autumn and spring sowing, graze and grain option for very high-rainfall zones. Blackleg resistance rating 2014, R–MR; resistance group A. Released 2012. Not tested in NVT trials. Bred and marketed by Pacific Seeds.

Pioneer® 43C80(CL): an early-maturing variety. Adapted to low-rainfall areas. Medium plant height. Blackleg resistance rating in 2013, MR–MS. Tested in NVT trials 2008–09 and 2011–12. Bred and marketed by DuPont Pioneer.

Pioneer® 43Y85(CL): early-maturing hybrid. Short–medium plant height. Moderate oil content. Suited to medium–low-rainfall areas. Blackleg resistance rating 2014, MR; resistance group A. Tested in NVT trials 2011–14. Bred and marketed by DuPont Pioneer.

Pioneer® 44C79(CL): an early-maturing to early–mid maturing variety. Medium plant height. Blackleg resistance rating in 2013, MS. Tested in NVT trials in 2008, 2009 and 2011. Bred and marketed by DuPont Pioneer.

Pioneer® 44Y84(CL): early-maturing to early–mid-maturing hybrid. High–very high oil content in 2013 trials. Medium–tall plant height. Blackleg resistance rating 2014, MS; resistance group A. Tested in NVT trials 2009–13. Bred and marketed by DuPont Pioneer.

Pioneer® 44Y87(CL): early–mid-maturing hybrid. Moderate–high oil content. Medium plant height. Suited to medium-rainfall areas. Blackleg resistance rating 2014, MR; resistance group A. Tested in NVT trials 2012–14. Bred and marketed by DuPont Pioneer.

Pioneer® 44Y89(CL): new release (coded PHI-1305). Early–mid-maturing hybrid. High oil content. Short–medium plant height. Suited to low–medium-rainfall areas. Blackleg resistance rating 2014, R–MR; resistance group BC. Tested in NVT trials 2013 and 2014. Bred and marketed by DuPont Pioneer.

Pioneer® 45Y86(CL): mid-maturing hybrid. High–very high oil content. Medium–tall plant height. Suited for dual-purpose (graze and grain) option in full-season environments. Blackleg resistance rating 2014, MR–MS; resistance group AB. Tested in NVT trials 2010–2014. Bred and marketed by DuPont Pioneer.

Pioneer® 45Y88(CL): mid-maturing hybrid. Moderate–high oil content. Medium plant height. Suited to high-rainfall areas. Blackleg resistance rating 2014, R–MR; resistance group A. Tested in NVT trials 2012–14. Bred and marketed by DuPont Pioneer.

SF Edimax CL: new release. Late-maturing, dual-purpose winter hybrid. Undergoing BASF Clearfield registration. Suited to early sowing and spring sowing in high-rainfall areas. Blackleg resistance rating 2014, R–MR; resistance group C. Not tested in NVT trials. Marketed by AGF Seeds.

2.2.4 Roundup Ready® varieties

DG 550RR: new release (coded VT-WZ-11-2685). Mid-maturing hybrid. High oil content. Blackleg resistance rating 2014, R-MR; resistance group AB. Tested in NVT trials 2013 and 2014. Bred and marketed by Seednet.

Hyola® 400RR: early-maturing to mid-early-maturing hybrid. Very high oil content. Medium plant height. Suited to low-medium-rainfall areas. Blackleg resistance rating 2014, R; resistance group ABD. Tested in NVT trials 2013 and 2014. Bred and marketed by Pacific Seeds.

Hyola® 404RR: early-maturing to mid-early maturing hybrid. Very high oil content. Medium plant height. Suited to low-high-rainfall areas. Blackleg resistance rating 2014, R-MR; resistance group ABD. Tested in NVT trials 2010-14. Bred and marketed by Pacific Seeds.

Hyola® 500RR: mid-maturing hybrid. Medium-tall plant height. High oil content. Suited to medium-high-rainfall areas. Blackleg resistance rating 2014, R; resistance group ABD. Tested in NVT trials 2013 and 2014. Bred and marketed by Pacific Seeds.

Hyola® 600RR: new release. Mid-maturing to mid-late-maturing hybrid. Very high oil content. Medium-tall plant height. Suited to medium-high-rainfall to very high-rainfall areas. No published GRDC blackleg resistance rating or resistance group 2014. Tested in NVT trials for the first time in 2014. Bred and marketed by Pacific Seeds

IH30RR: early-maturing hybrid. High oil content. Suited to low-medium-rainfall areas. Blackleg resistance rating R-MR; resistance group AB. Tested in NVT trials 2012-14. Bred and marketed by Bayer.

IH51RR: new release (coded AN13R9003). Mid-maturing hybrid with Bayer's new pod shatter reduction trait. High oil content. Suited to later windrow timings or direct harvesting in medium-high-rainfall areas. No published GRDC blackleg resistance rating or resistance group for 2014. Tested in NVT trials for the first time in 2014. Bred and marketed by Bayer.

IH52RR: new release (coded AN11R5201). Mid-maturing hybrid. High oil content. Suited to medium-high-rainfall areas. Blackleg resistance rating 2014, R-MR; resistance group AB. Tested in NVT trials 2013 and 2014. Bred and marketed by Bayer.

Monola® 513GT: early-mid-maturing, open-pollinated, specialty oil variety. Very high oil content. Medium plant height. Blackleg resistance rating 2014, MR. Tested in NVT trials 2012-14. Bred and marketed by Nuseed Pty Ltd.

Monola® G11: new release (coded NMH13G011). Early-mid-maturing, specialty oil hybrid. Very high oil content. Medium plant height. Blackleg resistance rating 2014, R-MR; resistance group ABS. Tested in NVT trials 2013 and 2014. Bred and marketed by Nuseed Pty Ltd.

Nuseed® GT-41: early-maturing hybrid. High oil content. Medium plant height. Blackleg resistance rating 2012, R-MR; resistance group ABF. Tested in NVT trials 2012-14. Bred and marketed by Nuseed Pty Ltd.

Nuseed® GT-50: mid-maturing hybrid. High-very high oil content. Medium-tall plant height. Blackleg resistance rating 2014, R-MR; resistance group ABF. Tested in NVT trials 2012-14. Bred and marketed by Nuseed Pty Ltd.

Pioneer® 43Y23(RR): early-maturing hybrid. Moderate-high oil content. Blackleg resistance rating 2014. R-MR; resistance group B. Tested in NVT trials 2011-14. Bred and marketed by DuPont Pioneer.

Pioneer® 44Y24(RR): early-mid-maturing hybrid. High oil content. Medium plant height. Suited to medium-high-rainfall areas. Blackleg resistance rating 2014, MR; resistance group C. Tested in NVT trials 2011-14. Bred and marketed by DuPont Pioneer.

Pioneer® 44Y26(RR): new release (coded PHI-1311). Early-mid-maturing hybrid. High-very high oil content. Medium-tall plant height. Suited to medium-high-rainfall areas.

Blackleg resistance rating 2014, R–MR; resistance group ABS. Tested in NVT trials 2013 and 2014. Bred and marketed by DuPont Pioneer.

Pioneer® 45Y25(RR): new release (coded PHI-1306). Mid-maturing hybrid. High–very high oil content. Medium plant height. Suited to medium–high-rainfall areas. Blackleg resistance rating 2014, R–MR; resistance group BC. Tested in NVT trials 2012–14. Bred and marketed by DuPont Pioneer.⁹

2.2.5 Roundup Ready®–triazine-tolerant varieties

New varieties are being developed that combine two herbicide tolerance traits, allowing improved weed control in paddocks where weeds have developed resistance to other herbicide chemistries.

Hyola® 525RT®: mid-maturing, RT® dual-herbicide-tolerant hybrid. High–very high oil content. Medium plant height. Suited to medium–high-rainfall areas. Blackleg resistance rating 2014, R–MR; resistance group ABD. Tested in NVT trials 2013 and 2014. Bred and marketed by Pacific Seeds.

Hyola® 725RT®: new release. Mid–late-maturing, RT® dual-herbicide-tolerant hybrid. High–very high oil content. Medium–tall plant height. Suited to medium–high-rainfall to very high-rainfall areas. No published GRDC blackleg resistance rating or resistance group for 2014. Tested in NVT trials for the first time in 2014. Bred and marketed by Pacific Seeds.

2.2.6 Juncea canola (*Brassica juncea*)

Juncea canola is adapted to low-rainfall areas (300–400 mm) and dry conditions. It has oil quality similar to canola, but still requires segregation and has designated delivery sites.

XCEED™ VT Oasis CL: first herbicide-tolerant Clearfield® juncea canola in Australia. Early–mid-maturing, open-pollinated variety. High oil content. Suitable for direct harvesting. Blackleg resistance rating R and resistance group G. Tested in NVT trials 2008–13. Bred by DEPI Victoria/Viterra. Marketed by Seednet. An EPR applies.¹⁰

2.3 Planting seed quality

2.3.1 Seed size

Canola seeds are smaller than other grains such as wheat, barley or lupins. They weigh only 3 mg each. The 1000-seed weight of canola is typically 3–6 g. Seed size varies according to the growing conditions. There are also varietal differences. Generally, hybrid varieties have larger seeds (Figure 1).

Seed size plays an important role in crop establishment. Larger seeds produce seedlings that are more vigorous and give improved crop establishment. There is also an interaction with sowing depth. Larger seeds establish more plants, particularly if sown at depth of ≥ 3 cm.¹¹

In practice, we target 2–3 cm sowing depth (3 cm if marginal moisture at surface). Larger seeds tend to have better establishment, so hybrids are sown at lower sowing rates (1.5–2 kg), compared with up to 3.5 kg for smaller seeded open-pollinated varieties.

Agronomist's view

⁹ Agriculture Victoria (2015) Victorian winter crop summary. 2015 edition. (Ed. K Holloway) Department of Economic Development, Jobs, Transport and Resources Victoria, <http://www.depi.vic.gov.au/agriculture-and-food/grains-and-other-crops/crop-production/victorian-winter-crop-summary>

¹⁰ Agriculture Victoria (2015) Victorian winter crop summary. 2015 edition. (Ed. K Holloway) Department of Economic Development, Jobs, Transport and Resources Victoria, <http://www.depi.vic.gov.au/agriculture-and-food/grains-and-other-crops/crop-production/victorian-winter-crop-summary>

¹¹ J Edwards, K Hertel (2011) Canola growth and development. PROCROP Series. NSW Department of Primary Industries, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/516181/Procrop-canola-growth-and-development.pdf

More information

[Monsanto: What is Roundup Ready® canola?](#)



Figure 1: Dr Abed Chaudhury cross-pollinating canola flowers. Following their discovery of two genes that control the size of plant seeds, CSIRO Plant Industry researchers are investigating how that knowledge can be used to produce larger seeds across a wide range of crops. (Photo: Carl Davies)

Birchip Cropping Group (BCG) trials at Horsham and Quambatook in 2013 showed that retaining hybrid seed could result in lost yield.

Key points:

- Retaining hybrid canola from one season to the next incurred a yield penalty of 0.3 t/ha at Quambatook. There was a general penalty of 0.2 t/ha for retained seed in the mean yield of all varieties (including open-pollinated) at Horsham.
- Oil content and test weights of retained seed were lower at Quambatook, but not at Horsham.
- Retaining hybrid seed compromises plant vigour, disease resistance and herbicide tolerance. The yield advantages (0.2–0.3 t/ha) from hybrid varieties, particularly within the Clearfield hybrid varieties, significantly outweigh the initial seed cost of \$44/ha at 2 kg/ha sowing rate.¹²

There are a lot of data to suggest retaining open-pollinated seed has very little impact on yield and oil provided seed quality is good.

Agronomist's view

More information

[BCG: Retaining hybrid canola](#)

[GRDC: Seed size matters for canola establishment](#)

[GRDC: Trial shows commercial hybrids deliver higher returns](#)

¹² BCG (2013) Retaining hybrid canola. Trial Details. Birchip Cropping Group, http://www.bcg.org.au/view_trial.php?trial_id=918&src=trial_docs.php

i More information

[GRDC: Canola establishment; does size matter?](#)

2.3.2 Canola establishment

Check the seed size every year—it can vary depending on how well the seed crop finished in the previous spring.

For *B. napus*, the range is 250,000–350,000 seeds/kg for open-pollinated varieties and 150,000–200,000 for hybrids. Table 3 shows the large difference in plant establishment rates for a given seeding rate between open-pollinated varieties and hybrids.¹³

Table 3: Number of canola plants established per m² from different sowing rates and establishment percentages of open-pollinated varieties (based on 290,000 seeds/kg) and hybrids (175,000 seeds/kg)

Sowing rate (kg/ha)	Establishment percentage					
	40%	50%	60%	70%	80%	90%
<i>Open-pollinated</i>						
2.0	23	29	35	41	46	52
3.0	35	44	52	61	70	78
4.0	46	58	70	81	93	104
5.0	58	73	87	102	116	131
<i>Hybrid</i>						
2.0	14	18	21	25	28	32
3.0	21	26	32	37	42	47
4.0	28	35	42	49	56	63
5.0	35	44	53	61	70	79

2.3.3 Seed germination and vigour

Seed quality is important for good establishment. Canola seed should have a germination percentage >85%. Planting high-quality seed is essential for rapid, even crop establishment.

Early seedling growth relies on stored energy reserves in the seed. Good seedling establishment is more likely if the seed is undamaged, stored correctly, and from a plant that has had adequate nutrition.

Seed moisture content, age of seed, seed size and germination percentage all contribute to seed quality. There can be substantial differences in the performance of commercial certified seed lots from different sources, and these differences can be as great as differences among varieties.

Several factors can greatly affect germination, including seed size, seed handling and harvest timing.¹⁴

The larger the seed, the larger the cotyledon and the lipid reserves. Although seed size does not affect germination, larger seeds have earlier and faster emergence than medium-sized and small seeds. This is because larger seeds germinate more rapidly and produce longer roots than smaller seeds. Under adequate moisture, medium-sized seeds will emerge in 5–6 days.

Seed size is usually measured by weighing 1000 grains; this is known as the 1000-seed weight. The 1000-seed weight differs among varieties and from season to season. As a result, sowing rates should be altered according to seed weight to achieve the desired plant population.¹⁵

¹³ L Jenkins (2009) Crop establishment. In Canola best practice management guide for eastern Australia. (Eds D McCaffrey, T Potter, S Marcroft, F Pritchard) GRDC, http://www.grdc.com.au/uploads/documents/GRDC_Canola_Guide_All_1308091.pdf

¹⁴ J Edwards, K Hertel (2011) Canola growth and development. PROCROP Series. NSW Department of Primary Industries, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/516181/Procrop-canola-growth-and-development.pdf

¹⁵ J Edwards, K Hertel (2011) Canola growth and development. PROCROP Series. NSW Department of Primary Industries, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/516181/Procrop-canola-growth-and-development.pdf

Harvest timing

The timing of windrowing can also affect germination. If the crop is not windrowed at the correct time, seed development can stop, resulting in unripe seeds with reduced germination ability.

Seed chlorophyll

High levels of seed chlorophyll can reduce seedling vigour and increase seedling mortality. Chlorophyll levels <35 mg/kg are desirable. Canola seed harvested from plants suffering frost or severe moisture stress during seed-filling may have elevated chlorophyll levels.

Seed handling

Germination can also be affected by seed-handling procedures. Care needs to be taken when harvesting canola seed to ensure that it is not cracked. Cracking can reduce germination.¹⁶

2.3.4 Seed storage

The aims of storage are to preserve the viability of the seed for future sowing and to maintain its quality for market. Canola is more difficult to store than cereals because of its oil content. The oil content makes canola more prone to deterioration in storage. For this reason, canola should not be stored on-farm for more than one summer.

The rate at which canola deteriorates in storage depends on:

- storage temperature
- seed moisture content
- seed oil content
- relative humidity
- storage time
- percentage of green or immature seeds in the sample
- amount of weathering after physiological maturity

Monitoring of seed moisture of canola is necessary during storage, because a moisture content of 6.0–8.5% can be unsafe, depending on the seed oil content (Figure 2).

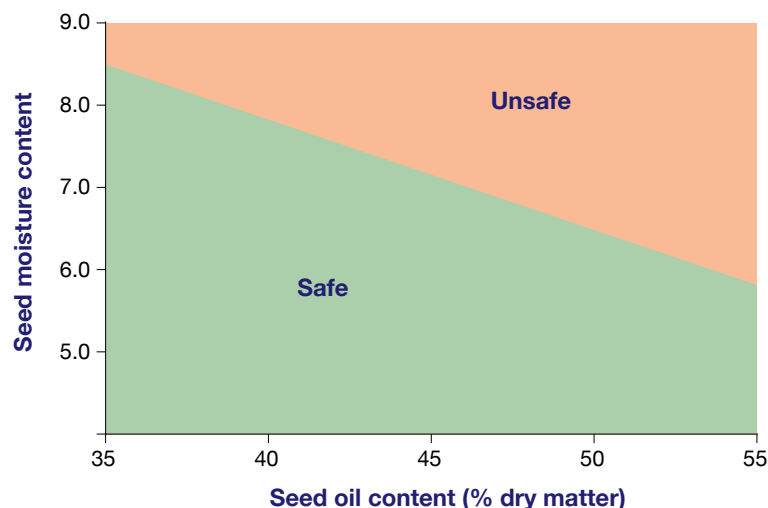


Figure 2: Potential unsafe storage limits for Australian canola varieties at 60% equilibrium relative humidity and 25°C. (Source: http://www.australianoilseeds.com/_data/assets/pdf_file/0006/4110/Oilseeds_Flyer.pdf)

¹⁶ J Edwards, K Hertel (2011) Canola growth and development. PROCROP Series. NSW Department of Primary Industries, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/516181/Procrop-canola-growth-and-development.pdf

High temperatures or moisture levels can cause a number of reactions in the seed, resulting in:

- increased levels of free fatty acids, causing off-flavours in the oil
- oxidation and browning reactions, which taint the oil
- changes to the oil profile of the seed, due to reactions involving chlorophylls, carotenoid pigments, flavonoids and phenols

Canola should be stored at $\leq 8\%$ moisture and at temperatures $< 25^{\circ}\text{C}$ (but preferably $< 20^{\circ}\text{C}$).

Safe storage limits are determined by the oil and moisture content of the seed. Canola falling into the potentially unsafe area above the line in Figure 2 should not be stored for any length of time unless appropriate action is taken, such as lowering the moisture content and seed temperature.¹⁷

More information

[IPNI: Care with fertiliser and seed placement](#)

[GRDC: Fertiliser toxicity](#)

[GRDC: Canola best practice management guide for south-eastern Australia](#)

More information

[BCG: Are canola and nitrogen good 'seed bed' fellows?](#)

[GRDC: Ground Cover – Optimising canola profitability](#)

2.3.5 Safe rates of fertiliser sown with the seed

Fertiliser at high rates is best separated from the seed at sowing, by banding. The risk of seed damage from fertiliser increases:

- with narrow sowing tines or discs, particularly at wider row spacing, where fertiliser becomes more concentrated close to the seed
- in more sandy soils
- in dry soils

BCG trials in 2012 at Sea Lake showed that applying urea with the seed, even deep-banded, can affect establishment and slow growth and development.

Key points included:

- There was no advantage in applying nitrogen (N) at sowing (deep-banded).
- The effects of seed burn on canola are much greater on sandier soils than on clay. Dry soils are also more susceptible than wet soils. If applying N up-front, rates should not exceed 10 kg N/ha (22 kg urea/ha) on 30 cm spacing, and seed should be separated by at least 3–4 cm from the N fertiliser.¹⁸
- However, this research should not discourage growers from applying adequate N fertiliser. NSW Department of Primary Industries research shows for every 1 t/ha of expected yield of canola, 80 kg N/ha needs to be made available through a combination of available mineral N at sowing, fertiliser application and mineralisation.¹⁹

¹⁷ J Edwards, K Hertel (2011) Canola growth and development. PROCROP Series. NSW Department of Primary Industries, http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0004/516181/Procrop-canola-growth-and-development.pdf

¹⁸ BCG (2012) Are canola and nitrogen good 'seed bed' fellows? Trial Details. Birchip Cropping Group, http://www.bcg.org.au/view_trial.php?trial_id=874&src=

¹⁹ GRDC (2015) Optimising canola profitability. Ground Cover Supplement Issue 117, July–August 2015. GRDC, <http://www.grdc.com.au/Media-Centre/Ground-Cover-Supplements/Ground-Cover-Issue-117-Optimising-canola-profitability>