Canola Varieties

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Take home messages

- **Crusher (TT), Garnet (conv), 44Y84 (IT) and Hyola 505 (RR) yielded significantly better than the site mean (2.20t/ha)**
- **oil (%) was above 42% in all varieties**
- **the best yielding of the triazine tolerant (TT) varieties were equal to the best of the other herbicide groups**
- **of the Clearfield tolerant (IT) varieties, hybrids (44Y84 and 45Y82) yielded 14% higher than conventional open pollinated varieties (44C79 and 43C80)**

Background

After a wet summer with record rainfall of 481 mm (November 2010 – March 2011), canola was sown with confidence in 2011. The area sown to canola in Victoria tripled, reflecting this confidence resulting from a full profile of stored soil moisture and the fact that paddocks were in need of a break from a dominant cereal rotation. Canola provides various herbicide options for controlling problematic weeds (ryegrass, brome grass and radish).

BCG trials since 2008 have shown that canola is the most profitable break crop for the Mallee (BCG 2010 Season Research Results, pg 35). However, canola, because of its higher demand for nitrogen and the cost of seed and herbicides, can expose growers to increased financial risk. Growing canola after a pulse crop or on fallow (or with >50mm of stored soil moisture) will substantially reduce that risk.

Methods

Location:	Corack	
Replicates:	4	
Sowing date:	21 April 2011 (harvested 14 November)	
Seeding equipment:	Gason parallelogram knife point, press wheel bar (30cm spacings)	
Fertiliser:	21 April	50kg/ha MAP (10% N, 21.9% P)
	17 June	90kg/ha GranAm (24% S, 20% N)
	15 July	90kg/ha Urea (46% N)
	2 August	90kg/ha Urea
Herbicides:	21 April	2L/ha Triflur X® (all plots)
	27 June	900g/ha Roundup Ready® (RR only) 1.1kg/ha Atrazine (TT only)

	14 July	750ml/ha Intervix® + 0.5% v/v Hasten® (IT only) 900g/ha Roundup Ready® (RR only) 500ml/ha Select® + 100ml/ha Lontrel® +Liase® 1 % b/v (Conv. only) 100ml/ha Verdict® + Uptake® (0.5% v/v) (all plots)
	10 Nov	Reglone® 1.5L/ha (all plots)
Fungicide	21 April	300ml/ha Flutriafol (Impact®) on fertiliser

Table 1. Details of the varieties sown in this trial

Description	Seed company	Herb. tolerance	Maturity	Blackleg rating	Sowing rate (kg/ha)
Hyola 404^	Roundup Ready	Pacific Seeds	Mid-Ear/Mid	R-MR	2.5
Hyola 505^		Pacific Seeds	Mid	R-MR	2.5
GT61		Nuseed	Early	MR-MS	3.5
GT Taipan		Nuseed	Early/Mid	MR-MS	3.5
GT Cobra		Nuseed	Early-Mid	MR (P)	3.5
GT Viper		Nuseed	Early	MR (P)	3.5
GT Couger		Nuseed	Mid	MR-MS	3.5
GT Mustang		Nuseed	Mid/Late	MR	3.5
ATR Stingray	Triazine Tolerant	Nuseed	Early	MR	3.5
Tawriffic		Nuseed	Early/Mid	MS	3.5
ATR Cobbler		Nuseed	Early-Early/Mid	MS	3.5
Monola 76TT		Nuseed	Mid	R-MR	3.5
ATR Snapper		Nuseed	Early-Early Mid	MS	3.5
Bonanza		Pacific Seeds	Early	MR	3.5
555TT		Pacific Seeds	Mid-Early	MR	3.5
Crusher TT		Pacific Seeds	Mid	MS	3.5
Hurricane TT		Pacific Seeds	Early	MR	3.5
Hyola 575^	Clearfield IT	Pacific Seeds	Mid	MR	3.5
Hyola 474^		Pacific Seeds	Mid-Early	R-MR	3.5
44Y84 ^		Pioneer	Early	MS	2.75
45Y82 ^		Pioneer	Early-Mid	MR	2.85
43C80		Pioneer	Early	MS	3.55
44C79		Pioneer	Early	MS	2.95
Hyola 50 ^	Conventional	Pacific Seeds	Mid	R	2.5
Hyola 433 ^		Pacific Seeds	Mid	R-MR	2.5
AV-Garnet		Nuseed	Mid	MR (R*)	3.5
AV-Zircon		Nuseed	Mid	MR (P)	3.5

^ Hybrid technology

(P) Provisional rating. There is insufficient data to meet National Blackleg Protocols.

(R) Observations indicate AV-Garnet may have reduced resistance on the Eyre Peninsula*

Plots were direct-headed with a Kingaroy plot harvester and oil content was measured using a Foss Infratec NIR whole grain analyser. Yields were corrected to 6% moisture. To ensure all varieties came in together, all plots were desiccated prior to harvest. The trial was direct headed prior to rain with the result that minimal loss from shattering or lodging occurred.

Results

With decile two rainfall during the growing season, conditions in 2011 should not have favoured canola production. The value of the soil moisture conserved over summer was yet another testimonial to the importance of controlling summer weeds. The profile showed 111mm/ha of plant available moisture. The site received 449mm from January to November. Of that, 124mm fell during the growing season (April 2011 to October 2011).

With a low soil nitrogen (N) status (total available N = 44kg N/ha) measured prior to sowing, there was a heavy reliance on applied N during the season. Three separate applications prior to rainfall events ensured that the canola was not N-stressed at any stage. Sulfur (14.5kg S/ha) was applied in June.

Even though the trial was sown in April, full emergence did not occur until the first week of June. At sowing, the topsoil was dry, with moisture at depth. The plots were intentionally sown slightly deeper (2-2.5cm) to chase some moisture and avoid mice damage. Little germination resulted; follow-up rainfall was required to stimulate germination. 3.5mm of rain was recorded on 9 May, but it was not until 16mm fell on 20 May that germination occurred. All plots emerged on 3 June. Between sowing and emergence, there was evidence of mouse damage, particularly in the neighboring cereal trials. The site was baited for mice several times with Mouse-off® (1kg/ha) to aid establishment.

Seeding rates were not varied to target a set plant density. The sowing rate was chosen based on the breeder's recommendation of the ideal densities for that variety (e.g. hybrids perform equally as well at lower plant densities (15-25pl/m^2) as at the higher (30-40/m^2). In this trial, the established plant densities ranged from 25-70pl/m^2. This variation in plant density was tested as a covariate with grain yield and was found to be not significant (P=0.684).

Weed burden at the site included barley grass, brome grass, Indian hedge mustard and, towards the end of the growing season, milk thistle. Late germination of mustard was persistent, particularly in the conventional plots. Roundup Ready plots were very clean, but required two applications of Roundup Ready herbicide at the 2 and 6 leaf stages. Verdict was applied over the entire trial to fit with district practice. Weed competition was low across all plots. No difference was observed in terms of weed control of the different systems.

Grain yields and oil content were above average. The trial mean yield was 2.20t/ha and oil was 44%. In the Triazine tolerant group, Crusher out-yielded 44C79, with a yield of 2.52t/ha. Of the four top-yielding varieties, one came from each herbicide group, three mid-maturity varieties and one early-maturing. Figure 1 illustrates the differences between varieties within a herbicide group (e.g. Triazine tolerant versus Clearfield). There was no difference in yield between the highest-yielding varieties in each group.

Table 2. Grain yield and quality for the canola varieties at Corack.

Description	Herbicide tolerance	Yield (t/ha)	Oil (%)	Test Weight (g/hl)
Hyola 404 RR	Roundup Ready	**2.45**	49	65
Hyola 505 RR		**2.50**	49	64
GT61		1.99	45	67
GT Taipan		2.13	44	69
GT Couger		2.14	43	67
GT Mustang		2.08	45	67
GT Viper		**2.33**	46	68
GT Cobra		**2.46**	46	67
ATR Stingray	Triazine tolerant	2.25	45	66
ATR Snapper		2.12	48	66
Crusher TT		**2.52**	43	66
Bonanza		1.83	43	68
Monola 76TT		1.92	45	65
555TT		2.31	42	66
Cobbler TT		2.23	44	68
Hurricane TT		1.98	45	67
Tawriffic		1.91	45	65
Hyola 575 CL	Clearfield IT	**2.39**	44	65
Hyola 474 CL		2.31	44	64
43C80 (CL)		2.11	46	68
44C79 CL)		2.11	44	67
44Y84 (CL)		**2.49**	45	66
45Y82 (CL)		**2.36**	44	67
Hyola 50	Conventional	2.41	46	66
Garnet		**2.51**	46	65
Hyola 433		2.21	44	64
AV – Zircon		**2.36**	47	66
P Value **LSD (P=<0.05)** **CV%**		**P<0.001** **0.21** **6.8%**	**P<0.001** **2** **2.5%**	**P0.012** **3** **2.9%**

Note: *Bonuses occur when oil is above 42% and also test weight standard is 62g/hl. Bolded* ***Yield values*** *were significantly better than 44C79 (common variety grown in this region).*

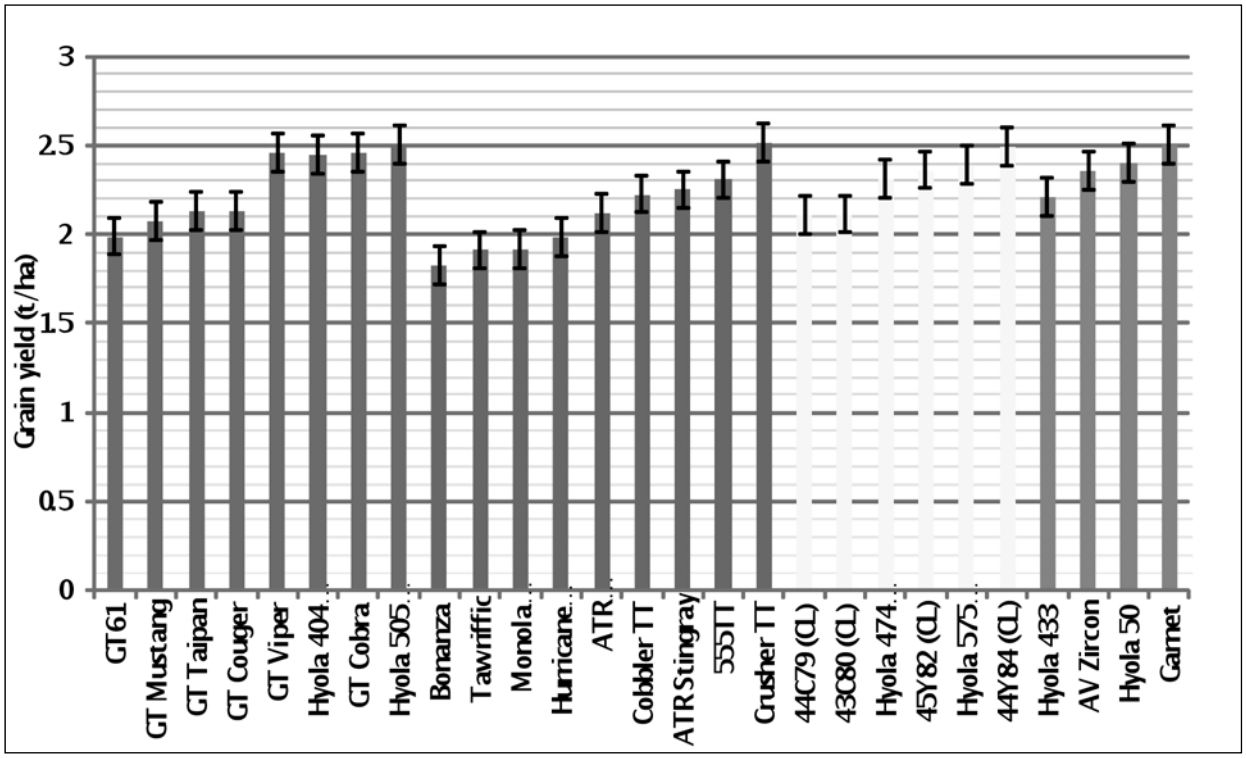

Figure 1. Grain yield results presented in their herbicide groups

The highest-yielding varieties, one from each herbicide group, were used for partial gross margin analysis (Table 3). This indicates the variation in the input costs and also income for these varieties.

Table 3. 'Partial' gross margins for the four top-yielding varieties in the 2011 Corack trial

Variety	Group	Seed cost ($/ha)	Herbicide cost ($/ha)	Fertiliser cost $/ha	Premium	Freight ($/t)	Total input costs $/ha	Yield t/ha	Price $/t	Income ($/ha)	Partial gross margin ($)
Hyola 505	RR	71.3	16.2	193.8	32.5	20	334	2.5	416	1,040	706
Crusher	TT	38.7	7.7	193.8	0	5	245	2.5	439	1,106	861
44Y84	IT	36.6	61.3	193.8	0	5	297	2.5	439	1,093	796
AV-Garnet	Conv.	33.8	11.2	193.8	0	5	244	2.5	439	1,102	858

+ The herbicide costs are based on what was applied as outlined in the methods. The cost of Triflur X was not included as all varieties received the same application. Please note that the input cost is only an estimate and does not include the cost of sowing or harvesting as they are considered to be the same for each system. Seed and herbicide costs are based on 2011 recommended retail prices and are subject to variation. Hyola 505 price and transport costs are based on delivery to Graincorp at Lubeck on the 2 December 2011, as it is the closest Roundup Ready receival point to Birchip. All other prices are based on delivery to AWB Birchip on the 2 December2011. Fertiliser costs are based on the applications of fertiliser used in this trial.

Table 4. The 2011 NVT yield data (Mallee)

Variety	Herb. Tolerance	Birchip yield (t/ha)	Minyip yield (t/ha)
Monola 707TT	Triazine Toerant	*	0.79
Monola 506TT		*	1.03
Thumper TT		*	1.03
Bonanza TT		1.58	1.12
ATR Cobbler		1.57	1.17
CB Scaddan		*	1.2
Monola 77TT		*	1.2
Monola 605TT		*	1.24
CB Telfer		1.5	1.26
Hyola 444TT		1.35	1.31
Monola 76TT		*	1.31
CB Mallee HT		1.37	1.36
ART Stingray		1.37	1.37
Tawriffic TT		1.5	*
CB Junee HT		1.6	*
ART Snapper		1.61	*
Hyola 555TT		1.71	*
CB Frontier RR	Roundup Ready	*	1.6
GT Cougar		*	1.65
GT Mustang		*	1.65
GT Scorpion		1.31	1.69
GT Taipan		1.25	1.73
CB Eclipse RR		1.43	1.78
GT Viper		1.56	1.82
Pioneer46Y20		*	1.83
Victory V5001RR		1.42	1.89
Victory V5002RR		1.33	1.95
GT Cobra		1.52	1.98
Hoyla 505RR		1.69	1.98
Hyola 404RR		1.74	*
Hyola 474CL	Imt-Tolerant	1.46	1.64
Pioneer 45Y82		*	1.71
Hyola 575CL		1.45	1.87
Pioneer 46Y83		*	1.91
Pioneer 44Y84		1.39	2.03
Pioneer 44C79		1.28	*
Pioneer 43C80		1.29	*
Xceed Oasis CL		1.31	*
Victory V3001	Conventional	*	1.6
Victory V3003		*	1.62
Victory V3002		*	1.67
Hyola 433		*	1.69
AV Zircon		*	1.7
CB Agamax		*	1.8
AV Garnet		*	1.83
Hyola 50		*	1.93

**Variety not sown at this location*

Birchip was sown on 13 May and Minyip sown on 26 May.

Interpretation

Several varieties yielded better than the two most commonly grown varieties 44C79 and Hurricane. Crusher (TT), Hyola 505 (RR), Garnet (Conv) and 44Y84 (IT) were the highest- yielding, each achieving 2.5t/ha. Given that each herbicide group includes an equally high- yielding variety, it appears the newer TT varieties do not have the yield penalties that were previously observed in TT varieties. 'Partial' gross margins show that the most profitable varieties were Crusher and Garnet, returning $861/ha and $858/ha respectively.

It is important to consider maturity timing when choosing a variety. 43C80 and GT61 were the only varieties that recorded any shattering. Both of these varieties are early maturing which may have suited an earlier harvest date.

These results demonstrate that growers may choose canola from any herbicide group without incurring a yield penalty. With a canola price of about $490t, canola grown in 2011 was profitable. However, it must be remembered that these yields are not achievable every year. Canola can be seen as a 'break crop', providing benefits in herbicide rotation, controlling resistant weeds and operating as a disease break. The advantages are not always considered.

The 2011 NVT canola trial results for the Mallee are presented in Table 4. To compare the results between this trial and the local NVT yields, please refer to these tables. Please note that the same varieties were not grown at the two different sites.

Commercial practice: what this means for the farmer

Varietal choice should be based on:

- weed spectrum
- the ability to control in-crop weeds with herbicide if necessary
- the most appropriate variety for the environment, ie. the time of maturity.
- proven performance (if there are a number of varieties that fit individual maturity and herbicide requirements)

References:

Browne C, Hunt J, Whitbread A, Hollaway G, Peoples M (2010) 'Break Crops for the Mallee', *BCG 2010 Season Research Results,* pg 35

Acknowledgments

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