

Farmer GM canola adoption strategies in dry farming systems

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Key messages

- GM Roundup Ready canola is increasingly being adopted in northern dryland farming environments.
- Adoption techniques are cautious and creative in the low rainfall areas.
- Dry and early sowing, using low seeding rates, being selective of soil types, using GM to manage weed issues and improve production have improved farmer returns and minimised the financial risk.
- Farmers are again encouraged to not overuse or abuse glyphosate and need to continue implementing IWM.
- An End Point Royalty scheme would increase farmer adoption in the low rainfall areas where margins are tight.

Aims

The adoption of Roundup Ready canola, since the State Government enabled an exception for it to be grown in 2010, has been rapid in the medium and high rainfall areas of WA. The area grown has risen to 33% of WA's canola crop. However, the rate of farmer adoption of Roundup Ready canola in the low rainfall regions has been low due to the cost and the financial risk of the technology. This paper will;

1. Document some farmer trial data associated with RR canola in dry regions
2. Discuss farmer techniques and how the technology has increased crop value in these dry regions
3. Explore the reasons for low adoption in the dry regions
4. Share experiences on the technology at my Morawa farm over a four year period.

Background

Some 75% of the 200,000 tonnes of canola that CBH received in 2015 grain crop was GM. The table adjacent, from GIWA, shows that canola is an important alternate crop to wheat in the Geraldton port, especially for the non-sandplain, or heavier, soil types. Lupins are grown predominantly on sandplain soils.

November 2015 WA Crop Production Estimates (tonnes)

Port zone	Wheat	Barley	Canola	Oats	Lupins	Field Pea
Kwinana	3,914,000	889,000	458,000	252,000	139,000	7,000
Albany	1,646,000	1,105,000	400,000	233,000	52,000	6,000
Esperance	1,552,000	956,000	447,000	17,000	20,000	21,000
Geraldton	1,790,000	55,000	173,000	19,000	272,000	1,000
Totals	8,902,000	3,005,000	1,478,000	521,000	483,000	35,000

This paper will collate farmer trial experiences and ideas to improve canola adoption in the broad-acre northern agricultural region of WA. Emails and phone discussions were had with various farmers and the grower groups in the region and trial data has been collated. The cost of RR hybrid canola seed is expensive for very dry regions; at about \$35/kg. Farmers need to make the technology less risky and more profitable. Farmers are tweaking and innovating the way that they grow RR canola to make it a more profitable tool in the Northern Agricultural region.

Methods and Results:

1. Crabtree Variety Trial

Seed was donated from Pacific Seed, NuSeed and Bayer (purchased from Pioneer) for a farmer trial (see table). The trial design was a randomised complete block comparing seven canola varieties by three replicates (21 plots). Plots were 1.6 km long by 12.2 m wide, totalling 41 ha in size. Seeding occurred on 22nd April into a drying topsoil at 2.9 kg/ha with 60 kg/ha of DAPs applied at sowing, below and to the side of the seed, with a Seed Hawk seeder on 30 cm row spacing's. Weeds were controlled with label rates of glyphosate and trifluralin. Aphids were controlled with 300 g/ha of pirimicarb. N fertiliser (UAN) was applied at 40 L/ha with the second application of glyphosate. April to September rainfall was 135 mm after February to March rain, in 3 main events, totalling 180 mm.

Variety	Yield (t/ha)	Oil (%)	Oil Bonus (\$/ha)	Returns (\$/ha)
GT41	1.09	45.8	\$ 29	\$ 585
43Y23	1.11	44.3	\$ 17	\$ 583
404	1.09	45.2	\$ 24	\$ 580
GT42	0.96	45	\$ 24	\$ 507
525RT	0.95	45.3	\$ 25	\$ 502
IH30	0.67	42.4	\$ 3	\$ 330
IH51	0.65	46.5	\$ 34	\$ 340

Plant establishment was patchy but adequate at greater than 20 p/m². The plots were direct harvested, without a cross auger with a 36 foot Honeybee front with minimal pod shattering. A yield monitor was used to collect the yield

data. The best three best varieties were; GT41, Pac404 and 43Y23, they all performed equally at 1.1 t/ha and had similar oil contents. The Bayer varieties yielded poorly and IH30 was not easy to harvest as it did shattered a little, while Bayer's Pod-Guard IH51 was very tolerant to pod shattering.

2. Latham – 2015 Variety Farmer Sized Demonstration

A GM canola demo was located just west of Latham and was conducted by Andy Regan, Landmark, Coorow. Two replicates of each variety were compared on 10 ha each (only 5 ha for GT42 and only one plot of oil was tested from 404 and GT41). The site was limed at 2 t/ha and deep ripped in autumn and was sown at 2 kg/ha on 17 April into moisture. MAP at 60 kg/ha was drilled a blend 10 kg/ha of MOP after topdressing 93 kg/ha of ammonium sulphate. In crop fertiliser was only 30 L/ha of UAN. Label rates of herbicides were applied and weed control was exceptional.

Variety	Yield (t/ha)	Oil (%)	Oil Bonus (\$/ha)	Returns (\$/ha)
404	2.15	47.1	\$ 39	\$ 1,174
GT42	1.95	44.3	\$ 17	\$ 1,017
Y23	1.89	43.8	\$ 14	\$ 977
GT41	1.81	45.0	\$ 23	\$ 950
IH30	1.71	44.2	\$ 17	\$ 883
525RT	1.41	45.1	\$ 25	\$ 729

This demo shows strong yields for GM canola, the best varieties were 404, GT42 and 43Y23. This is a consistent result over three years that Roundup Ready canola is a viable option and they have been the best gross margin crop for some growers in the Latham Maya district.

3. Mingenew Irwin Group – Two trials:

A large GM canola demo trial was located at **Yandanooka** on yellow gravel sand. In a replicated demonstration, seven RR canola varieties were sown. The paddock history from 2010 was Past:W:C:W:W. The canola was sown on the 21st April 2015. The paddock surrounding the trial was sown to 44Y24 and averaged 1.1 t/ha. The canola was sown at 2.2 kg/ha with a John Deere Air Drill 1830 on 250 mm spacings. Fertiliser included 80 kg/ha SOA before sowing, with 55 kg/ha MAPSCZ at sowing and 70 kg/ha of urea post sowing. Herbicides included Roundup and Treflan pre-sowing and 900 g/ha of RoundUp Plant Shield in crop. The crop had a fungicide application of Transform at 100 ml/ha. Lorsban at 300 mL/ha and 200 mL/ha alpha-cypermethrin insecticides were applied.

43Y23 has been a high yielding variety in this region for a number of years and has continued to perform well in 2015. An RT variety has dual herbicide tolerance – it incorporates RR tolerance with Triazine Tolerant hybrid canola varieties. 43Y23

has continued to be a consistent performer on heavier soils in 2015. Hyola 404 typically achieves yields higher on sandplain soil. 44Y24 achieved the highest returns due to both high oil and yield.

Variety	Yield (t/ha)	Oil (%)	Oil Bonus (\$/ha)	Returns (\$/ha)
43Y23	1.50	43.9	\$21	\$777
44Y24	1.40	48.7	\$71	\$778
GT 42	1.40	46.0	\$42	\$751
525 RT	1.32	47.4	\$54	\$721
Hyola 404	1.32	44.1	\$21	\$689
GT 50	1.29	45.3	\$32	\$686
GT 41	1.29	45.5	\$34	\$683

Another demonstration at **Wongoondy**, Mingenew, was located on red loam soil. Four RR and four TT canola varieties were replicated twice. The paddock history from 2010 was W:W:C:W:W before the canola was sown on 21st April 2015. The paddock surrounding the trial was sown to 43Y23 which averaged 1.2 t/ha and Sturt TT which averaged 0.75 t/ha.

All canola was sown at 1.8 kg/ha with a JD box and DBS bar on 300 mm spacings. Fertiliser included 65 kg/ha SOA before sowing, with 55 kg/ha MAPSCZ at sowing and 50 kg/ha of urea post sowing. Herbicides included Roundup, Garlon and Ecopar for knockdown and then Gramoxone and Treflan pre-sowing and followed by Roundup Ready Plant Shield in-crop and Atrazine and Elantra Extreme for the TT canola. The insecticides applied included 500 mL/ha of chlorpyrifos and 200 mL/ha Alpha Scud. The total annual rainfall was 299 mm, with 172 mm falling from April to September.

The 2015 season was dry and challenging for establishment. TT canola averaged 880 kg/ha with \$521/ha returns while the RR averaged 1,100 kg/ha and returned \$568/ha, this is worth an extra \$47/ha more for the RR. The short season RR hybrids returned \$90/ha more than the TT hybrids.

Variety	Yield (t/ha)	Oil (%)	Oil Bonus (\$/ha)	Returns (\$/ha)
Hyola 404RR	1.23	43.5	\$11	CAG1 \$633
43Y23 RR	1.18	44.5	\$19	CAG1 \$615
GT 41 RR	1.11	45.8	\$29	CAG1 \$589
GT 50 RR	0.89	39.9	-\$16	CAG1 \$434
	1.10	43.4	\$11	\$ 567.75
Hyola 559TT	1.02	44.5	\$21	CAN1 \$601
Hyola 450TT	0.92	46.3	\$37	CAN1 \$559
ATR BonitoTT	0.91	45.8	\$32	CAN1 \$549
Sturt TT	0.65	42.8	\$7	CAN1 \$376
	0.88	44.9	\$ 24	\$ 521.25

4. Tenindewa experience – Tim Critch

GM canola has been our highest yielding and cleanest crop and often has 10% more oil content. Despite this positive experience only half of our canola in 2015 was RR while the other was TT. An end point royalty would greatly reduce our financial risk and increase our area sown to RR canola since not all of our farms have good canola soil types.

5. General Farmer comments

- We currently have 700 ha of GM canola sown which represents 66% of our canola program. It is imperative that we maintain this option as part of our rotation to assist with weed management and ultimately decrease the use of chemical application – LH
- Without GM canola, cropping on our farm would not be sustainable due to increased weed pressure and resistance. This would make cropping unprofitable and therefore unviable and with sheep and wool prices historically not able to service current levels of farm debt, more than likely leave us with no option but to leave the farming industry – JC
- I've grown canola since leaving school in 1992, back then it was Hyola 42. Since 2010 I've grown RR canola, and it is a major part of my rotation. To have to go back to TT canola would be huge step back in profit and weed control for my operation – CE
- RR canola is essential for our profitability and in the fight against resistant weeds and the reduction of the use of more harmful herbicides. Our canola plantings on our properties are 100% RR and amount to 1,000 ha – RS
- I have been using GM canola for 5 years now with fantastic results from both a yield response but also from the perspective of ongoing ryegrass control and I am now able to continuously crop paddocks without the fear of losing control of the weeds – DA
- Our yields have lifted, I now budget 1.8 t/ha for RR canola instead of 1.5 t/ha with TT canola. I have better weed control in my cereal crops following the canola with no post emergent herbicide needed and we are having a much stronger return to clover pasture after the cropping phase having taken the residual atrazine out of the system – DS
- Going to wider rows and dropping the seed rate to 1.5 kg/ha reduces our seed cost and risk of drought failure. The hybrids are very drought tolerant and they give reliable yields in tough conditions with this formula – RB

6. East Gutha experience – Bill Crabtree

Like many farmers, I have learnt to sow canola dry in mid-April after some stored summer rainfall for the most reliable establishment and yield potential. In order to reduce the risk of winter drought failure I avoid sowing RR hybrid canola into heavy soils or soils that are very acidic and sandy. The RR cropped area is generally restricted to limed loamy soils where diverse weed pressure exists. Under these conditions I am usually able to achieve reasonable yields of 0.5-1.0 t/ha and return some profit to the farming system. The crop spreads my time of sowing over a larger window and ensures strong whole of farm weed control.

Conclusion

Farmers in the Northern Agricultural Region have rapidly embraced Roundup Ready hybrid canola as the main break crop for wheat on the medium and some lighter soils. The most consistent and high performing varieties, in these trials in 2015 were Hyola 404 and 43Y23. Lower seeding rates of 1.5-2.5 kg/ha are common with April dry sowing of canola and some on wider row spacing's. These techniques help to reduce the cost of the technology and improve the reliability. Many growers would further increase the area sown to Roundup Ready if an end point royalty system was introduced. Personally, if I had the option of paying an EPR, I would be prepared to pay 5-8% EPR with a minimal seed cost up-front. Growers are keen to retain their right to use this technology as it returns higher gross margins and increased vigour than TT canola in a dry season. Many growers report yield increases in the region of over 0.5 t/ha and excellent weed control, due to competition, compared to existing TT varieties.

Key words

GMO canola, hybrids, TT canola, RR canola, dry season, risk, weed control, time of sowing.

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