

# The importance and value of dual herbicide tolerant canola technology for WA growers into IWM strategies

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Hyola RT® canola is global first technology leading to new dual-herbicide tolerant hybrid canola being developed by Pacific Seeds in conjunction with Monsanto. The RT® Technology incorporates (RR) Roundup Ready® tolerance into elite TT (Triazine Tolerant) hybrids for Australian canola growers.

## Key messages:

- The combination of Triazines and Roundup Ready Herbicide provided superior control of ryegrass and Wild Radish over the current TT and RR systems.
- Canola is an important rotational winter crop, however with increasing herbicide resistance across multiple chemistries in WA, growers are experiencing increasingly limited options with the current herbicide tolerance technologies available
- Hyola RT® Technology allows the combination of strong knockdown and residual broad-spectrum herbicides from different herbicide groups and MOA, targeting a wide range of weed species.
- Hyola RT® will provide an important role in addressing the increasing Clethodim resistance problem.
- RT® dual herbicide tolerant Hybrids have now demonstrated their value as a new competitive IWM management tool, also providing increased convenience and flexibility of in-crop weed control

## Aims

To compare the variety performance and efficacy of weed control between the current Roundup Ready®, Triazine Tolerant and the new Hyola 525 RT® (Roundup Ready® + Triazine Tolerant) canola herbicide tolerant systems. To demonstrate and analyse the efficacy of various herbicide treatments and sequences that provide the best IWM options to achieve control of common hard to kill weeds such as Ryegrass and Radish and other weeds, whilst maximizing yield in Hybrid Canola varieties.

## Methods

The trials were designed, conducted and analysed by independent professional service provider organisations. Trials were sown and conducted as close as possible to district practice with plot seeders into a range of paddocks with different soil types, paddocks histories, soil nutrition and stubble retention practices. There were 9 trials individually analysed across 3 states, 5 in WA, 2 in NSW and 2 in Victoria.

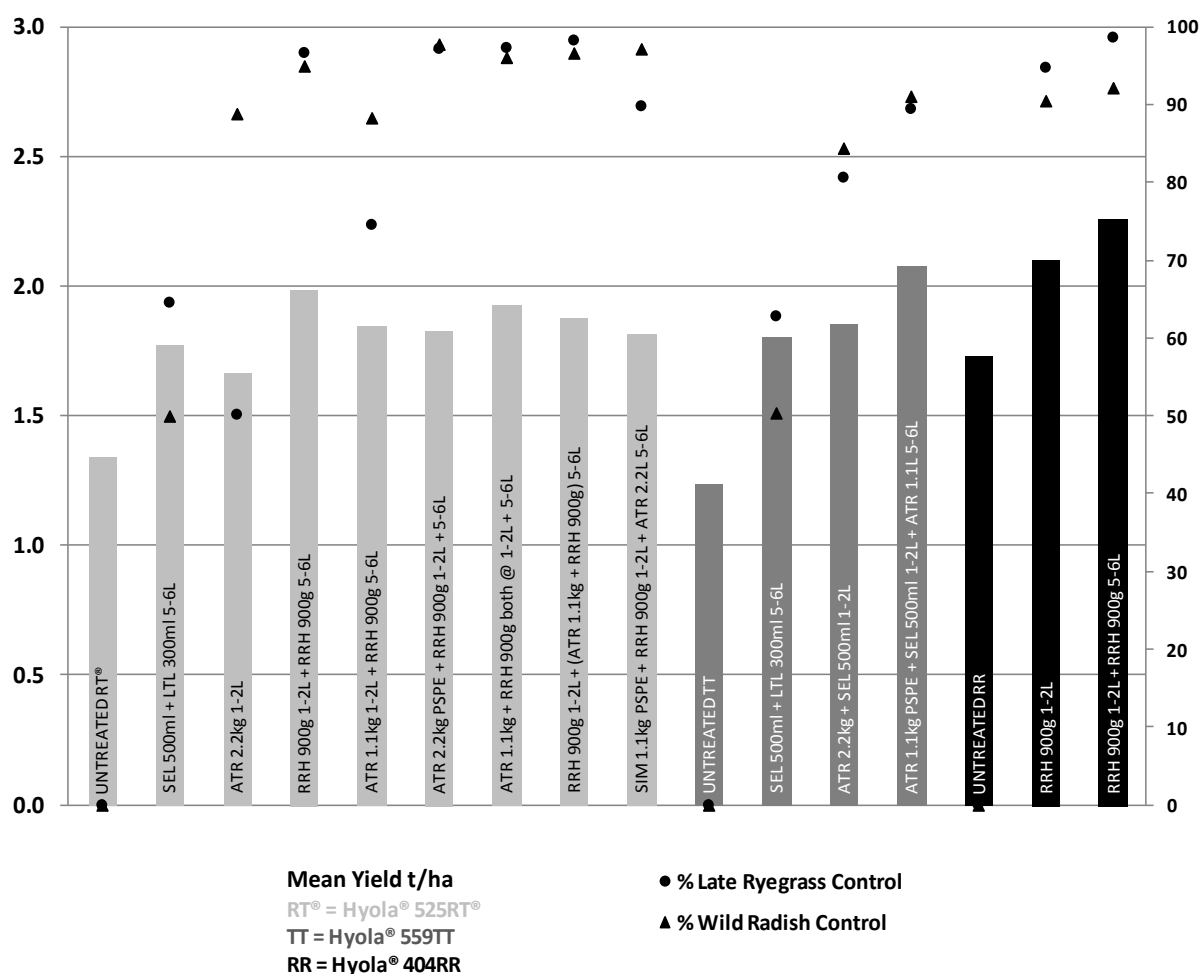
There were 16 different herbicide treatments including Roundup Ready® Herbicide (RRH), Atrazine (ATR), Simazine (SIM), Select (SEL - Clethodim) and Lontrel (LTR - Clopyralid) sprayed across 3 different canola varieties with different herbicide tolerance. The herbicides were used as standalone and in combinations using different rates and application timings. The varieties used in these efficacy trials were Hyola 404RR, Hyola 559TT and Hyola 525RT® from Pacific Seeds.

The target plant populations were 35 Plants/m<sup>2</sup> in Low to Medium rainfall zones and 50 Plants/m<sup>2</sup> in Medium to High rainfall zones. All varieties have been adjusted for seed count/kg and germination % to target plant numbers based on an estimated 50% establishment survival factorial.

All herbicides were applied according individual labels, except 5 treatments where Glyphosate and Atrazine were tank mixed together (currently an unregistered practice), which were applied under a trialling permit with Monsanto.

## Results and discussion

Each trial site was selected to provide higher weed pressures with mixed species. The main target weeds were Ryegrass and Wild Radish, also Brome Grass, Barley Grass and Wild Oats. Some of the paddocks had issues that challenged herbicide weed control such as herbicide resistance and non-wetting soils.



**Figure 1 2013 WA Hyola® RT® Efficacy Trials, Mean Yield MT/Ha + % Weed Control**

Arithmetic Mean Yield expressed in MT/Ha, including all herbicide treatments across all 5 replicated trial sites in Western Australia.

**Table 1 2013 Hyola RT® Efficacy Trial Yield Results – 9 Locations across Australia**

2013 Hyola RT Efficacy Trial Yield Results	COROWA	CUNDERDIN	GIBSON	KOJONUP	LAKE BOLAC	MINGENEW	RUPANYUP	STH STIRLING	TEMORA	Mean	Ryegrass Control %	Radish Control %
Herbicide: Application Rate & Timing	t/ha	t/ha	t/ha	t/ha	t/ha	t/ha	t/ha	t/ha	t/ha	t/ha	%	%
UNTREATED RT®	1.58	1.65	2.21	1.65	1.85	0.65	1.47	0.83	1.47	<b>1.49</b>	0.0	0.0
SEL 500ml + LTL 300ml 5-6L	1.71	1.86	3.28	1.74	1.90	0.60	1.74	1.34	1.48	<b>1.74</b>	86.6	80.0
ATR 2.2kg 1-2L	1.67	1.72	2.82	2.07	1.96	0.72	2.10	1.38	1.47	<b>1.77</b>	46.9	90.5
RRH 900g 1-2L + RRH 900g 5-6L	1.74	2.30	3.10	2.02	2.41	0.75	2.61	1.77	1.52	<b>2.03</b>	94.3	96.1
ATR 1.1kg 1-2L + RRH 900g 5-6L	1.63	2.07	2.90	1.93	2.60	0.69	2.12	1.69	1.38	<b>1.89</b>	83.5	96.1
ATR 2.2kg PSPE + RRH 900g 1-2L + 5-6L	1.67	2.15	2.80	1.92	2.69	0.73	2.15	1.62	1.39	<b>1.90</b>	93.5	93.5
ATR 1.1kg + RRH 900g both @ 1-2L + 5-6L	1.67	2.13	2.89	2.12	2.68	0.77	2.53	1.91	1.45	<b>2.02</b>	93.6	96.1
RRH 900g 1-2L + (ATR 1.1kg + RRH 900g) 5-6L	1.68	1.84	3.18	1.92	2.55	0.81	2.30	1.66	1.41	<b>1.93</b>	94.9	96.7
SIM 1.1kg PSPE + RRH 900g 1-2L + ATR 2.2L 5-6L	1.65	1.98	2.81	2.02	2.51	0.77	2.25	1.68	1.27	<b>1.89</b>	88.1	96.1
UNTREATED TT	1.56	1.66	1.70	2.06	1.58	0.77	1.47	0.81	1.33	<b>1.44</b>	0.0	0.0
SEL 500ml + LTL 300ml 5-6L	1.69	1.81	3.37	2.32	1.66	0.66	1.54	1.35	1.23	<b>1.74</b>	86.1	60.4
ATR 2.2kg + SEL 500ml 1-2L	1.65	2.04	2.82	2.40	2.60	0.85	2.25	1.66	1.34	<b>1.96</b>	91.4	95.5
ATR 1.1kg PSPE + SEL 500ml 1-2L + ATR 1.1L 5-6L	1.94	2.19	3.45	2.36	2.74	0.91	2.05	1.75	1.51	<b>2.10</b>	94.3	95.5
UNTREATED RR	1.89	1.90	2.72	2.25	1.92	0.96	1.83	1.31	1.59	<b>1.82</b>	0.0	0.0
RRH 900g 1-2L	2.13	2.34	3.23	2.87	2.60	1.13	2.49	1.69	1.61	<b>2.24</b>	91.6	93.1
RRH 900g 1-2L + RRH 900g 5-6L	2.06	2.62	3.56	2.93	2.81	0.95	2.76	1.88	1.73	<b>2.37</b>	95.8	95.5

Across all 5 Hyola RT® efficacy trials in WA, the Roundup Ready Hybrid Hyola 404RR yielded the highest out of all 3 technologies, while Hyola 525RT® yielded similar to Hyola 559TT as expected. All treated plots within RT, TT and RR technology showed higher yields than untreated plots by 300-600kg. The untreated Hyola 404RR yielded higher than Hyola 525RT® and Hyola 559TT untreated plots due to the RR inherent higher vigour allowing the Hyola 404RR to provide better weed competitiveness.

The 2 x 900g RRH spray strategy applied at 1-2 leaf followed by 5-6 leaf consistently out-yielded all other treatments. This spray regime achieved great weed control, but provided less final weed control than most combinations of both Glyphosate and Atrazine or Simazine. The single RRH spray at 1-2 leaf stage allowed subsequent weed germinations resulting in poor final weed control and a reduction in yield, which demonstrates the importance of a second follow up spray of 900g/Ha RRH.

These trials demonstrated that low numbers of ryegrass can have a significant impact on grain yield and that the 2<sup>nd</sup> RRH application needs to be as late as possible, within label recommendations to maximise control.

The best control of both ryegrass and radish was achieved with 3 different treatments on Hyola 525RT when the combination of Triazines and the Roundup Ready Herbicide were applied. The highest result was provided when Atrazine either pre-emergent or post emergent, with 2 applications of RRH at 900g applied at 1-2 leaf and 5-6 leaf stage. Although

the addition of Atrazine to the RRH increased weed control, the timing of applications did not show any significant differences. The combination of 2.2kg of Atrazine (PSPE) + 900g RRH at 1-2 + 900g RRH at 5-6 leaf gave over 97% final control of both ryegrass and wild radish.

The RR and RT® treatments demonstrated improved control of ryegrass where Select (Clethodim) is failing, suggesting that Glyphosate can be an alternative within the RT® technology system to Select in the TT system. Select alone at a high use rate of 500ml/Ha provided unacceptable ryegrass control at only 62%, contributing to a significant yield loss. The addition of 2.2kg Atrazine to 500ml/Ha Select, a common TT chemical use pattern, still only achieved 80% control of ryegrass 84% control of wild radish. By Replacing select with Roundup Ready Herbicide, weed control was dramatically increased by 10-15% for both weed species which also had a positive effect on yield.

In WA, recent test results have shown 65% of ryegrass populations contained plants resistant to Select at the 250ml label rate, while a further 42% of populations also contained plants resistant to Select at the higher label rate of 500ml/ha (AHRI, 2011), which highlights the need for RT® technology in canola IWM systems. This was evident at the Mingenew site where Select alone at 500ml/Ha only gave 10.5% control of Ryegrass. This is validated further by both Hyola 525RT® and Hyola 404RR with the 2 spray RRH strategy providing better weed control and higher yields than all treatments on Hyola 559TT in The Triazine Tolerant system.

The treatments where Roundup Ready Herbicide and triazines were combined yielded similar to the 2 spray RRH strategy within Hyola 525RT® plots, and provided better final weed control. Some combinations gave improved weed control over any treatments on the TT and RR varieties.

In all of the WA trials, control of weeds was observed to be more successful when the weeds were very small and using the full rate of 2.2 kg/Ha of Atrazine plus spray oil on the RT® and TT Hybrids. The best TT treatments on Hyola 559TT achieved similar yields to Hyola 525RT but provided much less final weed control, only managing 89% control of ryegrass and 91% control of Wild radish. Due to Atrazine residual activity depending on moisture, temperature and aerobic soil conditions, using split applications rather than increased rates provided better residual control of weeds within the TT system.

## **Conclusion**

The best strategy for the use of the RT® technology will vary in different situations depending on weed spectrum, soil type, herbicide resistance status and soil moisture. These trials clearly demonstrated that the 2 applications of 900g RRH sprays in conjunction with triazines is the best approach for improved IWM strategies. From an IWM perspective, RT® canola can be a valuable addition to manage the development of herbicide resistance as it uses two different herbicides in the cropping season with different modes of action and relatively low resistance profiles. As with all herbicide resistance management strategies though, this system will only be effective if used as one part of a whole IWM strategy, including non chemical tactics such as higher plant population competitiveness, autumn tickles, double knocks, windrow burns, weed seed destruction and capture techniques.

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