

# Tolerance of Hyola<sup>®</sup> 525RT<sup>®</sup> canola to glyphosate mixes

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## Key messages

Two-way tank mixes of glyphosate 612g a.i./ha with atrazine 990g or simazine 1980g or clethodim 120g or clopyralid 90g or dicamba 100g or propyzamide 500g a.i./ha applied at 3-4 leaf stage of canola caused no significant loss of grain yield or oil content of Hyola<sup>®</sup> 525RT<sup>®</sup>. Dicamba mix caused transient chlorosis after its application.

Glyphosate at 612g a.i./ha tank mixed with s-metolachlor at 960 g a.i./ha or oxyfluorfen at 48g a.i./ha and applied at 3-4 leaf stage of canola caused significant loss in grain and oil yield, and oil content of Hyola<sup>®</sup> 525RT<sup>®</sup>.

Oxyfluorfen is not registered on canola at all, whereas post-emergent use of s-metolachlor and propyzamide is also not registered on canola.

## Aims

To determine the tolerance of a new canola variety Hyola<sup>®</sup> 525RT<sup>®</sup> to glyphosate mixes with other herbicides. The mixes were designed for better management of the weeds like mallows (*Malva* spp), storksbill (*Erodium* spp), legumes and medics, in RR and/or RT canola as these weeds are not controlled effectively by glyphosate or triazines alone. The mixes will also reduce selection pressure on glyphosate. Resistance in annual ryegrass and wild radish to both glyphosate and triazines has been reported in Western Australia.

## Method

Trial Year and Location	2015 and J & S Greaves' property, North Mingenew.
Soil Type pH (CaCl <sub>2</sub> ) and OC (%)	Yellow sand plain 5.5 and 0.8
Paddock history	2014 - wheat, 2013 – lupins, 2012 – wheat, 2011 – lupins, 2010 – wheat.
Trial design	Criss-cross with two systematic untreated control plots per replication.
Plot size (net) and replications	20 X 1.1 m (5 rows at 22 cm row spacing) and 3 reps. To convert plot yield to kg/ha, 1.8 m plot width was used (plot to plot centre).
Seeding date and rate	29 May and 3 kg/ha
Seeding machinery and depth	Coneseeder with knife points and press-wheels and 2 cm deep.
Fertilizers	Agstar Extra 80kg/ha at seeding and urea 50kg/ha top dressed on 29 May. UAN 50 L/ha applied on 16 July 2015.
Soil moisture at seeding Method used Rainfall within in 4 WAS*	0-10 cm: 5.9 %, 10-20 cm: 5.6 % Volumetric method 38.1 mm
Treatment application date: 3-4 leaf stage	Please see Table 1 for treatment details. 6 July 2015.
Herbicide application machinery	Spray rig with shields on boom at a width of 1.5 m. Air induction nozzles and 80 L/ha water volume used.
Visual observations scale:	0 to 100 %, where 0 = no visible injury & 100 = complete plant death.
Visual observation dates:	15 and 27 July, and 8 Oct.
Blanket Sprays	Roundup Ultra <sup>®</sup> max 1.6 L/ha on 1 May, Spray.Seed <sup>®</sup> 2 L + Dominex <sup>®</sup> 200 mL + Lorsban <sup>®</sup> 200 mL/ha on 28 May. Select <sup>®</sup> 500 mL + Hasten <sup>™</sup> 1% on 3 August 2015.
Harvesting date	October 2015
Grain oil content (%)	Cropscan 2000B NIR analyser and it was adjusted to 6% moisture level.
Oil yield (kg/ha)	Grain yield (kg/ha) x grain oil content (%) / 100
Data analysis	ANOVA using GenStat program.

Rainfall (mm) :	2015	May	June	July	Aug	Sept	Oct	Total
		18	38	50	49	10	2	166

## Results and Discussion

The trial yielded quite low mainly because of dry conditions at Mingenew during 2015. The average grain yield in the untreated control plots (nil) was 160 kg/ha. During 2015 at Mingenew, total rainfall from May to October was 166 mm which was 47% lower than the last year's rainfall (312 mm) during the same period.

Glyphosate at 612g a.i./ha applied mixed with atrazine 990g or simazine 1980g or clethodim 120g or clopyralid 90g or propyzamide 500g a.i./ha at 3-4 leaf stage of canola, did not produce any visual symptoms. These two-way mixes also had no significant negative effect on grain and oil yield, and grain oil content of Hyola<sup>®</sup> 525RT<sup>®</sup> (Table 1). Post-emergent use of propyzamide on canola is not registered.

Glyphosate 612g a.i./ha mixture with dicamba 100g a.i./ha applied at 3-4 leaf stage of canola caused noticeable yellowing of crop plants (15%) 3 weeks after its application. However, plants recovered with the advancement of crop growth and this mix had no effect on grain yield, oi content and oil yield of Hyola<sup>®</sup> 525RT<sup>®</sup> (Table 1).

Glyphosate 612g a.i./ha applied tank mixed with s-metolachlor 960 g a.i./ha at 3-4 leaf stage of canola caused 20% spotting on leaves exposed to the spray. New growth was unaffected. This mix resulted in significant reduction in grain and oil yield, and lower oil content in Hyola<sup>®</sup> 525RT<sup>®</sup> (Table 1). S-metolachlor belongs to group K and its post-emergent use on canola is not registered.

Glyphosate 612g a.i./ha applied tank mixed with oxyfluorfen 48g a.i./ha at 3-4 leaf stage of canola caused severe spotting on leaves exposed to the spray (on an average 70% of leaf area affected - Photo 1). These symptoms were translated into significant loss in grain and oil yield, and lower oil content in Hyola<sup>®</sup> 525RT<sup>®</sup> (Table 1). The results are in line with the earlier work done by Moore (2002). Oxyfluorfen is a contact herbicide, belongs to group G and more readily absorbed by shoots (leaves) than roots. Oxyfluorfen is not registered on canola.

## Conclusion

Glyphosate at 612g a.i./ha two-way mixes with simazine or atrazine or clethodim or clopyralid or propyzamide at the maximum label rates applied at 3-4 leaf stage of canola, had no significant negative effect on grain yield, oil content and oil yield of Hyola<sup>®</sup> 525RT<sup>®</sup> canola. Glyphosate mixed with dicamba at 100 g.a.i./ha and applied at the 3-4 leaf stage of canola caused transient chlorosis with no effect on grain yield or oil content. Propyzamide is not registered to use as post-emergent on canola.

Glyphosate at 612g a.i./ha applied tank mixed with s-metolachlor at 960 g a.i./ha or oxyfluorfen at 48g a.i./ha at 3-4 leaf stage of canola caused significant reduction in grain and oil yield, and oil content of Hyola<sup>®</sup> 525RT<sup>®</sup>. Oxyfluorfen and post-emergent use of s-metolachlor are not registered on canola.

## References

Moore, John (2002) Tolerance of canola to herbicides. In "Proceedings of the 13th Australian Weed Conference". Perth, Western Australia. (Eds S Spafford Jacob, J Dodd and JH Moore) Pp. 348-51.

**Note:** For use of dicamba on canola, please check permit to allow minor use (Permit number—PER 13477).

**Always follow label recommendations. The Department of Agriculture and Food WA, does not endorse the use of herbicides above the registered rate or off-label use of herbicides or off-label tank mixes. Crop tolerance and yield responses to herbicides are strongly influenced by seasonal conditions.**

## Key words

RT Canola, glyphosate mixes, tolerance, grain yield, oil yield.

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**Table 1: Effect of glyphosate mixes applied at 3-4 leaf stage of canola on grain and oil yield (% of untreated control), and oil content (%) of Hyola® 525RT® at Mingenew during 2015 (15GE39B).**

No	Herbicides	Rate a.i./ha	Grain yield	Oil Content (%)	Oil yield
0	Untreated Control		100 (160 Kg/ha)	43.0	100 (74 Kg/ha)
1	Glyphosate 690 (RR)	621 g	99	42.8	112
2	Glyphosate + atrazine	621 g + 990 g + Hasten 1%	107	43.1	99
3	Glyphosate + simazine	621 g + 1980 g	103	42.8	95
4	Glyphosate + clethodim	621 g + 120 g + Hasten 1%	113	42.9	104
5	Glyphosate + clopyralid	621 g + 90 g	121	43.0	112
6	Glyphosate + dicamba	621 g + 100 g	99	42.9	92
7	Glyphosate + propyzamide	621 g + 500 g	121	43.3	112
8	Glyphosate + s-metolachlor	621 g + 960 g	<b>71</b>	<b>42.4</b>	<b>65</b>
9	Glyphosate + oxyfluorfen	621 g + 48 g	<b>61</b>	<b>42.4</b>	<b>56</b>
Isd (0.05) Control vs Herbicides (1-tail)			24	0.5	22
Isd (0.05) Herbicides vs Herbicides (1-tail)			28	0.5	25
CV (%)			21	0.9	19

The products used in the trial were Roundup Ready® Herbicide 960 (glyphosate), Atrazine 600, Select® 240 (clethodim), Lontrel® 300 (clopyralid), Dicamba 500, Dual® Gold (s-metolachlor), Simazine 900, Rustler 500 (propyzamide) and Goal® (oxyfluorfen). Oxyfluorfen is not registered on canola at all, whereas propyzamide and s-metolachlor are registered on canola as pre-emergent herbicides only.

The grain yield and oil content was adjusted to 6% moisture.

Figures in **BOLD** are significantly lower than untreated Control.



**Photo-1:** Symptoms of glyphosate 621g + oxyfluorfen 48g a.i./ha applied at 3-4 leaf stage of canola cv Hyola® 525RT® 10 days after application.