

Wild radish control in Roundup Ready canola

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Purpose:	To investigate and demonstrate means to ensure effective control of wild radish in Roundup Ready canola grown on non-wetting sand.
Location:	Badgingarra Research Station
Soil Type:	Pale sand
Rotation:	2009 wheat
GSR:	300mm

BACKGROUND

Roundup Ready canola provides exceptional general weed control, including wild radish, using a two spray strategy. A single late spray does not achieve absolute control because weeds are getting too big, while a single early spray normally allows too much time for subsequent germination. Without the benefit of a soil residual herbicide the Roundup Ready canola system is vulnerable to subsequent germination of wild radish, particularly on non-wetting soils where partial and delayed wetting can lead to significant staggered germination of both weeds and crop. This trial attempts to illustrate the benefit of a two spray strategy compared with single spray strategies, and investigates the use a soil wetter (to improve early weed and crop emergence) and a robust sowing rate (to proving a solid, early crop canopy) as means to address the lack of a soil active component in its herbicide regime.

TRIAL DESIGN

The trial is laid out in a Multi-Factorial design consisting of two main plots (the presence or absence of soil wetter), two subplots (sowing rate) and seven sub-subplots (herbicide regime).

Sub-subplot: Six rows x 10 metres

Machinery: Small plot seeder, knife point and press wheel

Repetitions: 3

Crop details: GT-Scorpion (open pollinated, Nuseed) on 21st May 2010

Seeding rates: 1.5 5 kg/ha in Trts 1 – 7 and 15 – 21
3 kg/ha in Trts 8 – 14 and 22 – 28

Fertilizer: **At seeding:** 150 kg/ha MAXam (topdressed IBS); 100 kg/ha Vigour Atlas (banded below the seed)
Post (7/8/10): 150 kg/ha MAXam

Herbicide: **Pre-seeding (20/5/10):** 2 L/ha PowerMAX; 2 L/ha TriflurX; 1 L/ha Chlorpyrifos; 400 mL/ha Alphacypermethrin

Soil Wetter: Half the trial (treatments 1-14) was treated with soil wetter on 7th May and again on 21st May immediately after sowing. The other half was untreated (treatments 15-28)

Post-seeding herbicide treatments:

Treatments	1+ 15	2+ 16	3+ 17	4+ 18	5+ 19	6+ 20	7+ 21	8+ 22	9+ 23	10 + 24	11+ 25	12+ 26	13+ 27	14+ 28
900 g/ha Roundup Ready Herbicide (22/6/10- 2 leaf)		x							x					
900 g/ha Roundup Ready Herbicide; 0.05% v/v LI700 (22/6/10- 2 leaf)					x							x		
900 g/ha Roundup Ready Herbicide (6/7/10- 6 leaf)			x							x				
900 g/ha Roundup Ready Herbicide; 0.05% v/v LI700 (6/7/10- 6 leaf)						x							x	
900 g/ha Roundup Ready Herbicide (19/7/10- 7 leaf)				x							x			
900 g/ha Roundup Ready Herbicide; 0.05% v/v LI700 (19/7/10- 7 leaf)							x							x

2-leaf timing, 22nd June (crop 10% cot, 10% 2-leaf, 20% 2.5-leaf, 30% 3-leaf and 30% 4-leaf); 6-leaf timing, 6th July (crop 10% 2-leaf, 10% 3-leaf, 50% 4-leaf, 25% 5-leaf and 5% 6-leaf); 6-leaf timing, 19th July (crop 10% 4-leaf, 20% 5-leaf, 50% 6-leaf, 20% 7-leaf)

RESULTS & DISCUSSION

Overall control of wild radish

- 2-leaf only treatments achieved total control of the treated population, but with some minor subsequent germination after treatment final control was rated 91-92 percent.
- 6-leaf only treatments failed to control the treated population achieving final control of 80-86 percent.
- 2-leaf followed by 6-leaf treatments achieved total control of the original treated population and total control of radish that subsequently germinated.

Affect of seeding rate

The two seeding rates achieved average final canola stands across the trial site of 24 and 48 plants per sqm. Three weeks prior to harvest the untreated control plots at the low rate had an average of 73 podded radish plants per sqm compared with 61 plants on plots at the high rate. Sowing rate appeared to have a greater impact on ryegrass with 209 ryegrass spikes per sqm on plots at the low seeding rate and 57 on high rate plots.

The double timing treatments (at 2-leaf and 6-leaf) achieved absolute control at both seeding rates. The benefit of a high seeding rate is demonstrated by the single timing treatments: the 2-leaf only treatments achieved 89 percent control at the low seeding rate and 94 percent at the high rate, while the 6-leaf only treatments achieved 78 percent and 87 percent respectively. It is clear from this result that a higher seeding rate is beneficial. Had the site experienced greater pressure from subsequent germination there may well have been a differentiation between the two double timing treatments as well.

Affect of soil wetter

The application of soil wetter two weeks before seeding with a top-up immediately after seeding had no impact on the control of wild radish. This may be a factor of the wetter used, or it may be a factor of the sandy nature of the site (compared to a forest gravel). The zero response, though, is more likely related in part to the timing of the first application. This

application was applied to dry soil with no impending rain too soon to seeding. Just 14 mm, over two days, a week later proved to have no impact as did the rain after seeding.

Affect of LI700

LI700 had no impact on wild radish control under the conditions of this trial.

Results and Factorial Analysis of Variance for Wild radish control

Treatment	73 DA-A Percent control	102 DA-A Percent control	147 DA-A Podded plants
TABLE OF R MEANS			
Replicate 1	82	78	11
Replicate 2	83	79	13
Replicate 3	83	78	16
LSD (P=.05)	NSD	NSD	NSD
TABLE OF A MEANS			
Soil wetter	82	79	14
No Soil wetter	83	78	13
LSD (P=.05)	NSD	NSD	NSD
TABLE OF B MEANS			
sown 1.5 kg/ha	82	76	16 a
sown 3 kg/ha	83	80	11 b
LSD (P=.05)	NSD	NSD	5.4
TABLE OF C MEANS			
Nil	0 c	0 d	67 a
RRH @ 900 g/ha [2-leaf]	100 a	92 ab	7 b
RRH @ 900 g/ha [6-leaf]	88 b	80 c	8 b
RRH @ 900 g/ha [2 & 6-leaf]	100 a	100 a	0 b
RRH @ 900 g/ha [2-leaf] with LI700	100 a	91 a	6 b
RRH @ 900 g/ha [6-leaf] with LI700	88 b	86 bc	5 b
RRH @ 900 g/ha [2 & 6-leaf] with LI700	100 a	100 a	1 b
LSD (P=.05)	2	9	10
TABLE OF AB MEANS			
With Soil wetter, sown 1.5 kg/ha	82	78	17
Without Soil wetter, sown 1.5 kg/ha	82	75	16
With Soil wetter, sown 3 kg/ha	82	80	11
Without Soil wetter, sown 3 kg/ha	83	81	10
LSD (P=.05)	NSD	NSD	NSD
TABLE OF AC MEANS			
With Soil wetter, nil RRH	0	0	73
Without Soil wetter, nil RRH	0	0	61
With Soil wetter, RRH @ 900 g/ha [2-leaf]	100	93	6
Without Soil wetter, RRH @ 900 g/ha [2-leaf]	100	91	8
With Soil wetter, RRH @ 900 g/ha [6-leaf]	87	82	11
Without Soil wetter, RRH @ 900 g/ha [6-leaf]	90	78	5
With Soil wetter, RRH @ 900 g/ha [2 & 6-leaf]	100	100	1
Without Soil wetter, RRH @ 900 g/ha [2 & 6-leaf]	100	100	0
With Soil wetter, RRH @ 900 g/ha [2-leaf] with LI700	100	89	4
Without Soil wetter, RRH @ 900 g/ha [2-leaf] with	100	94	7

With Soil wetter, RRH @ 900 g/ha [6-leaf] with LI700	88	90	2
Without Soil wetter, RRH @ 900 g/ha [6-leaf] with	89	81	8
With Soil wetter, RRH @ 900 g/ha [2 & 6-leaf] with	100	100	0
Without Soil wetter, RRH @ 900 g/ha [2 & 6-leaf]	99	99	1
LSD (P=.05)	NSD	NSD	NSD
TABLE OF BC MEANS			
sown 1.5 kg/ha, nil RRH	0	0	73
sown 3 kg/ha, nil RRH	0	0	61
sown 1.5 kg/ha, RRH @ 900 g/ha [2-leaf]	100	88	11
sown 3 kg/ha, RRH @ 900 g/ha [2-leaf]	100	96	3
sown 1.5 kg/ha, RRH @ 900 g/ha [6-leaf]	87	70	12
sown 3 kg/ha, RRH @ 900 g/ha [6-leaf]	90	89	4
sown 1.5 kg/ha, RRH @ 900 g/ha [2 & 6-leaf]	100	100	1
sown 3 kg/ha, RRH @ 900 g/ha [2 & 6-leaf]	100	100	0
sown 1.5 kg/ha, RRH @ 900 g/ha [2-leaf] with LI700	100	90	9
sown 3 kg/ha, RRH @ 900 g/ha [2-leaf] with LI700	100	93	2
sown 1.5 kg/ha, RRH @ 900 g/ha [6-leaf] with LI700	89	86	7
sown 3 kg/ha, RRH @ 900 g/ha [6-leaf] with LI700	88	85	3
sown 1.5 kg/ha, RRH @ 900 g/ha [2 & 6-leaf] with	99	100	1
sown 3 kg/ha, RRH @ 900 g/ha [2 & 6-leaf] with	100	99	1
LSD (P=.05)	NSD	NSD	NSD

Yield data

The trial was harvested on the 5th November, 24 weeks after seeding. Yields are tabulated on the following page. Single timing treatments of Roundup Ready Herbicide had very low levels of radish pod contamination and this was not removed from the yield samples; the figures in the table therefore may have a small amount of admix. Double timing treatments were free of wild radish pods and the figures in the table therefore represent pure canola yield.

Radish pods were screened from the Untreated Check plots and the figures shown in the table therefore also represent pure canola yield. The equivalent of 1.5 – 2.1 ton per hectare of wild radish pods were removed from the four UTC samples.

Comparing the mean yield of the four (ie with and without LI700) low seeding rate double timing treatments with the equivalent mean at the high seeding rate indicates that on average the high seeding rate provided an additional 0.38 ton/ha grain.

At a price of \$615 per ton this represents an additional \$233.70 per hectare at an increased input of \$22.50. Importantly too, though, the higher seeding rate ensures a more solid crop stand and therefore better ensures against the impact of a significant staggered germination (not realized or demonstrated in this trial because of the season).

Treatment	Yield (t/ha – excluding radish from UTC)							
	seeding rate 1.5 kg/ha				seeding rate 3 kg/ha			
	+Soil wetter		-Soil wetter		+Soil wetter		-Soil wetter	
UTC	0.272	h	0.423	h	0.560	h	0.509	h
RRH @ 900 g/ha [2-leaf]**	1.197	g	1.488	c-g	1.897	abc	1.844	a-d
RRH @ 900 g/ha [6-leaf]**	1.340	efg	1.635	b-g	1.707	a-f	1.806	a-f
RRH @ 900 g/ha [2 & 6-leaf]	1.489	c-g	1.512	c-g	1.639	b-g	1.853	a-d
RRH @ 900 g/ha [2-leaf] with LI700**	1.496	c-g	2.142	a	1.544	c-g	1.867	a-d
RRH @ 900 g/ha [6-leaf] with LI700**	1.827	a-e	1.385	d-g	1.914	abc	2.153	a
RRH @ 900 g/ha [2 & 6-leaf] with LI700	1.321	fg	1.520	c-g	1.763	a-f	2.106	ab

LSD (P=.05)

0.493

CV

20.010

Means followed by same letter do not significantly differ (P=.05, LSD)

*** Yields inflated by a small amount of radish pod admix*

ACKNOWLEDGEMENTS/ THANKS

WMG for including this trial in their trial program.

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