

Knockdown herbicide mixes for the control of grass and broadleaf weeds



The aim of this trial was to investigate the efficacy of knockdown mixes and timings on the control of ryegrass and broadleaf weeds prior to cropping.

Summary

This demonstration investigated knockdown weed control options prior to sowing.

For the knockdown control of ryegrass, canola and wild radish prior to sowing, glyphosate is quite effective and no additional herbicides are generally required. Glyphosate is weak on marshmallow and a group G herbicide is required as a mix with the glyphosate.

To reduce the risk of group M (glyphosate) resistance developing in ryegrass it is strongly recommended to use the 'double knock' approach (glyphosate followed four to seven days later by SpraySeed®) on at least some paddocks every year.

Background

Prior to cropping, knockdown herbicides (eg. glyphosate) are often used in a mix with other herbicides to improve efficacy of broadleaf and grass weed control, or with other knockdown herbicides (eg. paraquat) applied at different timings (ie. 'double knock' applications). Effectiveness of control is often dependent on the weed to be controlled, the choice of herbicide in the mix and the conditions at the time of spraying.

In this trial, the BCG-WFS investigated a large number of herbicides used to improve efficacy of glyphosate for the control of ryegrass and a range of broadleaf weeds (including marshmallow, self-sown canola, capeweed and wild radish).

In order to differentiate the effect of glyphosate from the additional herbicide (eg. Roundup® plus Striker®), the additional herbicide (in this case Striker®) was also tested on its own.

Methods

The demonstration of knockdown efficacy was undertaken at the BCG-WFS herbicide resistance trial site located approximately 20km south of Charlton. Treatments were applied as single boom-width strips of herbicide - 6m wide by 30m long. A 6m-wide trial boom, fitted with XR11002 nozzles at 3 bar pressure, 12km/hr ground speed and a water volume of 80L/ha was used for spraying.

The products and rates used are listed in Table 1. The active ingredients are listed in Table 2.

Table 1. Products and rates used in the herbicide knockdown demonstration

Product	Rate/ha	Cost \$/ha
Roundup CT + wetter	1.2L + 0.1% wetter	6.70
Roundup Power Max	1L	7.10
Roundup Power Max + Striker	1L + 100ml	10.80
Striker	100ml	3.70
Roundup Power Max + Hammer	1L + 50ml	15.90
Hammer	50ml	8.80
Roundup Power Max + Pledge*	1L + 30g + Hasten 0.5%	-
Pledge*	30g + Hasten 0.5%	-
Roundup Power Max + Logran	1L + 15g	15.80
Roundup Power Max + Logran B Power	1L + 20g	21.10
Roundup Power Max + Logran	1L + 20g	18.70
Roundup Power Max + Logran B Power	1L + 25g	24.60
SpraySeed	1.5L + wetter 0.1%	14.70
Roundup Power Max; SpraySeed (4 days later)	1L, 1.5L + wetter 0.1%	21.80
Roundup Power Max; SpraySeed (11 days later)	1L, 1.5L + wetter 0.1%	21.80

* Pledge is not currently registered in Victoria.

Table 2. List of active ingredients used in the herbicide knockdown demonstration.

Product	Active ingredient	Herbicide group
Roundup CT	glyphosate 450gai	M
Roundup Power Max	glyphosate 540gai	M
Striker	oxyfluorfen	G
Hammer	carfentrazone	G
Pledge*	flumioxazin	G
Logran	trisulfuron	B
Logran B power	trisulfuron; butafenacil	B, G
SpraySeed	diquat; paraquat	L

* Pledge is not currently registered in Victoria.

All products were applied on April 26 with the exception of the second SpraySeed® applications (applied four or eleven days later). Weather conditions at the time of spraying were as follows:

Temperature:	23 degrees
Humidity:	40%
Wind:	5-8 km/hr NE
Sun/cloud:	Sunny conditions

At the time of spraying weeds were relatively well advanced (Table 3).

Table 3. Size of weeds at the time of spraying of the herbicide knockdown demonstration.

Weed	Number of leaves	Diameter (cm)
Ryegrass	mid-tillering	15
Canola	7 to 8	30
Capeweed	10	25
Marshmallow	15 to 20	20
Wild radish	10 to 12	30

Results

The effectiveness of the herbicide applications was assessed just prior to sowing on May 22 (26 days following the main spray treatments; and 22 days and 11 days respectively after the second SpraySeed® application in the ‘double knock’ treatments) (Table 4). All plots were scored using the EWRC scoring system (EWRC scores: 1 = no affect, 3 = some visual affect, 5 = strong visual but weed not dead, 7 = very strong visual and weed growth retarded but not dead, 9 = dead).

Table 4. EWRC scores for weed control in the herbicide knockdown demonstration

Product	Rye-grass	Cape-weed	Canola	Marsh-mallow	Radish
Roundup CT + wetter	7	7	6	4	7
Roundup Power Max	7	7	7	5	8
Roundup Power Max + Striker	7	7	7	7	8
Striker	1	4	2	4	2
Roundup Power Max + Hammer	7	8	7	8	7
Hammer	1	np [#]	3	6	6
Roundup Power Max + Pledge*	7	9	7	8	8
Pledge*	1	3	5	5	4
Roundup Power Max + 15g Logran	7	6	5	5	7
Roundup Power Max + 20g Logran B Power	7	8	4	7	8
Roundup Power Max + 20g Logran	7	7	5	5	7
Roundup Power Max + 25g Logran B Power	7	7	5	9	8
SpraySeed	8	6	8	6	7
Roundup Power Max; SpraySeed (4 days later)	8	np	9	5	np
Roundup Power Max; SpraySeed (11 days later)	8	6	8	3	8

np = not present in plot

* Pledge is not currently registered in Victoria.

Interpretation

Ryegrass

Ryegrass control with Roundup CT® and Roundup PowerMax® was effective, although 26 days after application the ryegrass was not quite dead, but unlikely to recover (EWRC score 7). The addition of other knockdown herbicides (Striker®, Hammer®, Pledge) did not add to the knockdown effect on ryegrass, in fact these products used alone (without glyphosate) had little or no effect on ryegrass. Logran® or Logran B Power® in combination with glyphosate did not improve the effectiveness of weed kill. However, SpraySeed® either alone or applied as a ‘double knock’ did improve efficacy and the ryegrass appeared almost dead (EWRC score 8).

Capeweed

Capeweed control with Roundup CT® and Roundup PowerMax® was effective and did not improve with the addition of Striker® or Hammer®. However Roundup PowerMax® with Pledge resulted in complete weed kill. Roundup PowerMax® with Logran® or Logran B Power® was no more effective than Roundup CT® and Roundup PowerMax® alone. SpraySeed® used alone or as a ‘double knock’ with Roundup PowerMax® did not improve on the weed kill compared to Roundup CT® and Roundup PowerMax® alone.

Canola

Canola control with Roundup CT® and Roundup PowerMax® was effective and there was no improvement in weed kill with the addition of Striker®, Hammer® or Pledge. The addition of Logran® or Logran B Power® did not improve weed kill neither, although over the longer term the weed kill with Logran® or Logran B Power® could be expected to improve (Logran® is a group B herbicide, the canola variety was Beacon – a triazine tolerant variety which is susceptible to group B herbicides). SpraySeed® either alone or as a ‘double knock’ was very effective for killing canola.

Marshmallow

Roundup CT® or Roundup PowerMax® alone were not effective in controlling marshmallow, however the addition of Striker® improved control. The addition of Hammer® or Pledge improved control again. Similarly Roundup PowerMax® with Logran® was not very effective but the addition of Logran B

Power[®] improved efficacy (presumably due to the butafenacil component). SpraySeed[®] either alone or as a 'double knock' with Roundup PowerMax[®] was not very effective on marshmallow.

Wild Radish

Roundup CT[®] and Roundup PowerMax[®] alone or Roundup PowerMax[®] in mixes were very effective in controlling wild radish. It is expected that the addition of Logran[®] or Logran B Power[®] would have resulted in better longer term control as radish is susceptible to group B herbicides. The effectiveness of SpraySeed[®] either alone or as a 'double knock' was similar to Roundup PowerMax[®].

Commercial Practice

Growers using knockdown herbicides prior to sowing need to know which weeds are present and how effective the herbicides are in controlling those weeds. In many situations it is well known that the best additive to glyphosate is more glyphosate. It is clear from this demonstration that this applies to weeds such as ryegrass, canola and wild radish. It definitely does not apply for the control of marshmallow. Marshmallow is difficult to control and an additional herbicide (generally a group G herbicide) is required for an effective kill. Even then, this weed is difficult to control especially if it has established a strong tap root.

Traditionally one of the most effective mixes for the control of marshmallow is Roundup + Hammer[®] + 2,4D Ester 800[®]. Contact your local agronomist for advice about rates as they will depend greatly on weed size, conditions etc. It is important to adhere to all of the spray regulations required when using 2,4D Ester 800[®].

To reduce the risk of group M (glyphosate) resistance developing in ryegrass it has been well demonstrated that the 'double knock' approach (glyphosate first followed 4 to 7 days later by SpraySeed[®]) is very effective. The SpraySeed[®] application burns off survivors and ensures they do not recover from the initial application of glyphosate. It is strongly advised that growers investigate this technique and if they are regular users of glyphosate that they start to implement the 'double knock' approach on at least some paddocks every year.