

Double Knockdown, one day between knocks

Peter Newman, Research Officer and Glenn Adam, Technical Officer, Department of Agriculture, Geraldton

KEY MESSAGES

- Where glyphosate is applied first, it is possible to safely apply Spray.Seed® as soon as one day (24 hours) later when growing conditions are good. This interval should not be reduced to less than 24 hours as weed control may be compromised.
- Glyphosate first followed by Spray.Seed®, both at full label rates, is still the best double knockdown sequence.
- Applying Spray.Seed® first in the double knockdown sequence is possible for ryegrass control, however, broadleaf weed control may be compromised.

AIMS

Every year in Western Australia, thousands of hectares of ryegrass are sprayed with glyphosate. The double knockdown technique has been developed to minimise the risk of ryegrass, and other weeds, of developing resistance to glyphosate. Research into this technique in recent years has been focused on the sequence and timing of the double knockdown technique in order to make the technique more user friendly to farmers. This trial aims to answer the questions (a) what is the ideal timing between knocks, and (b) what is the best sequence of knockdown herbicides.

METHOD

Double Knockdown treatments were applied in a cross plot design, i.e. first knock treatments were applied in a 6 m wide strip followed by second knock treatments applied in 3m wide strips at 90 degrees to the first knock at various intervals after the first knock. Treatments were applied using the Department of Agriculture ground spray rig in 70 L water / ha. Plots were assessed by counting surviving weeds in 0.1 m² quadrats.

Trial Details

Property	Paul and Sue Kelly, Mingenev
Plots / replication	3m x 6m, 3 replications, cross plot trial design.
Soil type	Yellow Loamy Sand (some gravel)
Paddock rotation	2003 Volunteer Pasture (capeweed and ryegrass dominant) 2002
Time of Spraying	Break of season: 9 May 03 First knock applied: 25 May 03 Weeds at first knock: Ryegrass 3 to 4 leaf, Capeweed 5 to 15cm diameter
Herbicides	Roundup PowerMAX® (540 g/L glyphosate) 900 mL/ha; Spray.Seed® (Paraquat 135 g/L + Diquat 115 g/L) 1.4 L/ha

RESULTS

Background weeds: un-sprayed plots - ryegrass 623 /m², Capeweed 116 / m²

Note: Gly = glyphosate 900 mL/ha Roundup PowerMax®; SS = Spray.Seed® 1.4 L/ha; Gly/SS refers to glyphosate followed by Spray.Seed® and so on; 1 hour, 1day etc refers to time interval between applications of knockdown herbicides; n.s. refers to no significant difference (p>0.05)

Table 1: Surviving ryegrass and capeweed (plants / m²) for a range of double knockdown treatments compared to single knockdown (i.e. Gly/Nil & SS/Nil).

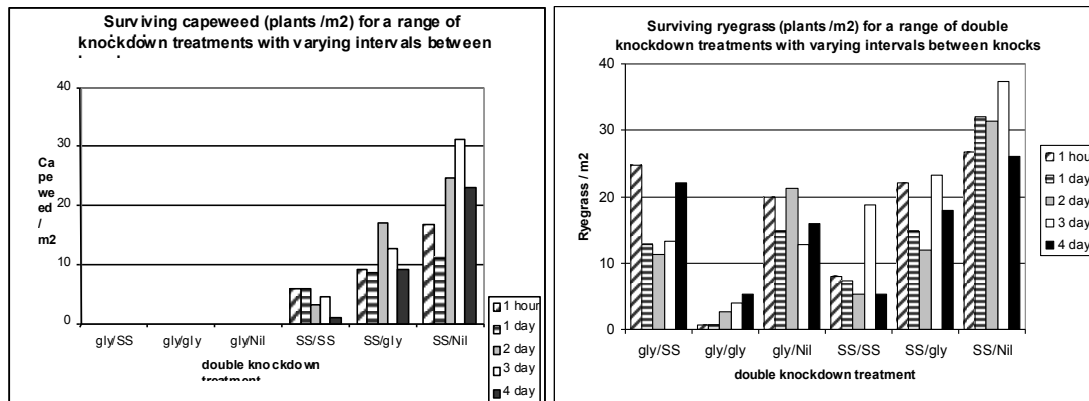
	Gly/SS	Gly/gly	Gly/Nil	SS/SS	SS/gly	SS/Nil	LSD .05
Ryegrass (plants/m ²)	16.8	2.67	16.9	8.9	18	30.6	6.0
Capeweed (plants/m ²)	0	0	0	4.3	11.5	21.5	7.35

Table 2: Surviving ryegrass and capeweed (plants / m²) for a range of intervals between knockdown treatments averaged over all double knockdown treatments.

	1 hour	1 day	2 day	3 day	4 day	LSD .05
Ryegrass (plants/m ²)	17	13.7	14	18.2	15.4	n.s.
Capeweed	5.3	4.3	7.6	8.1	5.7	n.s.

(plants/m²)

There was no significant difference between the interval of double knockdown treatments. However, in another trial at Mingenew, weed control was reduced where Spray.Seed[®] was applied 1 hour after glyphosate.



CONCLUSION

- Glyphosate followed by Spray.Seed[®] with at least one day between knocks is the best double knockdown practice. The data shows that a number of double knockdown practices are possible for ryegrass. However, for broadleaf weeds such as capeweed, it is best to apply glyphosate first in the sequence. This trial was conducted under ideal growing and spraying conditions. If plants were stressed or growing slowly, it may be necessary to allow at least two days for glyphosate to translocate throughout the plant before applying the second knock of Spray.Seed[®].
- Spray.Seed[®] should be applied at least 24 hours after glyphosate for an effective double knockdown. There was little difference in weed control between any of the intervals between knocks for a range of herbicides. However, another trial in Mingenew in 2003 demonstrated that applying Spray.Seed[®] one hour after spraying glyphosate led to a significant reduction in weed control compared to where Spray.Seed[®] was applied one or two days after glyphosate. It is likely that the Spray.Seed[®] applied one hour after glyphosate shut down the plant before the glyphosate was translocated to the growing point.
- Glyphosate followed by more glyphosate was a very effective treatment as was Spray.Seed[®] followed by more Spray.Seed[®]. However, these practices are not recommended for the obvious reason that it promotes the development of herbicide resistance. It is interesting to note that glyphosate will kill a plant that is already stressed by a previous glyphosate application. This information may be useful in situations where glyphosate does not kill weeds due to poor application technique. It appears that a glyphosate 'top up' may be an option in some situations.
- The double knockdown technique has not been extensively tested on all weeds in WA. It is possible that weeds such as wild radish, that are known to be difficult to control with glyphosate, may respond differently to the weeds tested here. Future trial work will focus on testing this technique over a greater range of weed species.

KEY WORDS

Double Knockdown, herbicide resistance, ryegrass, glyphosate, Spray.Seed[®]

ACKNOWLEDGEMENTS

Many thanks to Paul and Sue Kelly for the trial site and to the Mingenew / Irwin Group for their support of this project.

Project No.: DAW 672

Paper reviewed by: Abul Hashem and Catherine Borger