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Yield and composition of lucerne stands in Central Otago after different winter grazing and weed control treatments

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Note:

This presentation was made by Prof. Derrick Moot on 5 Nov 2014 in Alexandra at the New Zealand Grassland Association Annual Conference.

It is associated with the following scientific publication:

Roux, M., Leask, S. K. and Moot, D. J. 2014. Yield and composition of lucerne stands in Central Otago after different winter grazing and weed control treatments. *Proceedings of the New Zealand Grassland Association*, **76**, 89-96.

Objectives

- Is a glyphosate/atrazine combination effective for weed control?
- Does it cause phytotoxicity damage to lucerne?
- Can peak lucerne production be changed by winter herbicide and/or winter grazing management?

The experiment

- On-farm at Hills Creek (Central Otago)
- Dryland, optimum soil pH
- 3 year old ‘Kaituna’ lucerne stand
- Clean-up graze on 12 June 2012

The experiment

Strip plot design (4 reps)

- 3 grazing dates

  (6 Sept, 2 Oct, 14 Nov)

- 4 herbicide spray dates

  (Unsprayed control, 3 Jul, 22 Aug, 18 Sept)

  Glyphomax XRT 480 – 960 g ai/ha

  Nu-trazine 900 DF – 960 g ai/ha

Strip plot design

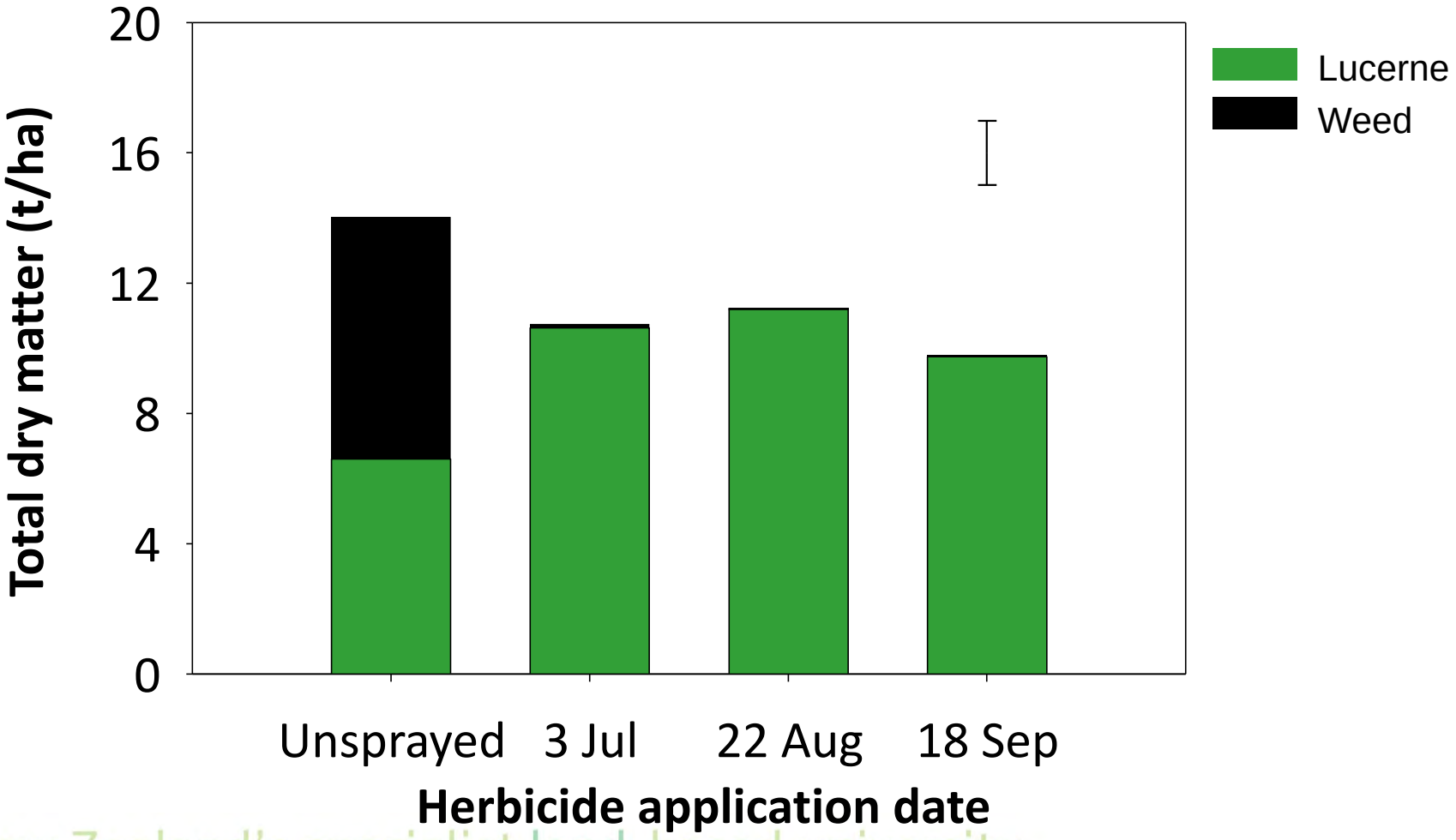
Grazing date

Herbicide application	06-Sep	14-Nov	02-Oct
Control	1	5	9
22-Aug	2	6	10
03-Jul	3	7	11
18-Sep	4	8	12

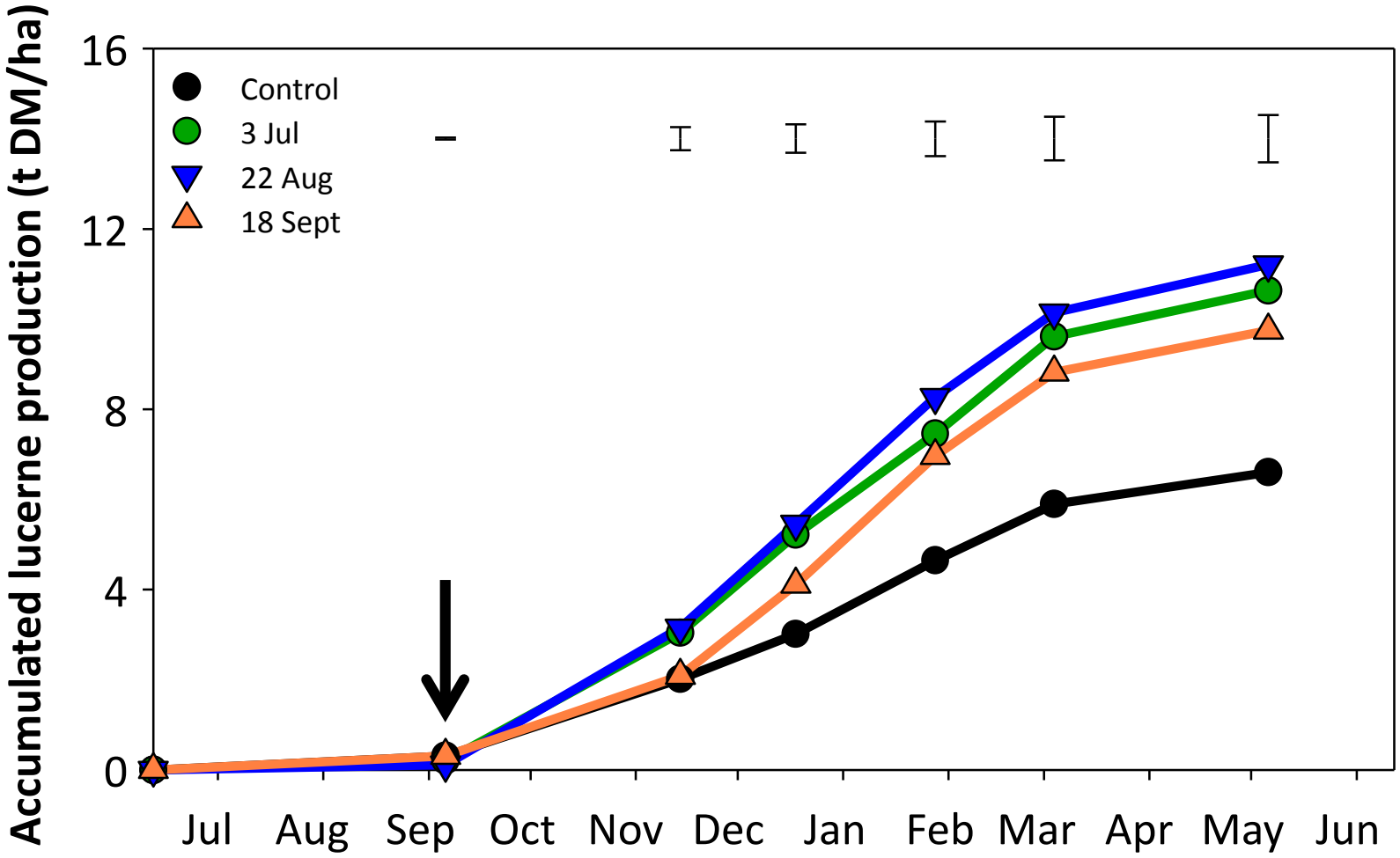
Rep 1

Strip grazing maintained through growing season

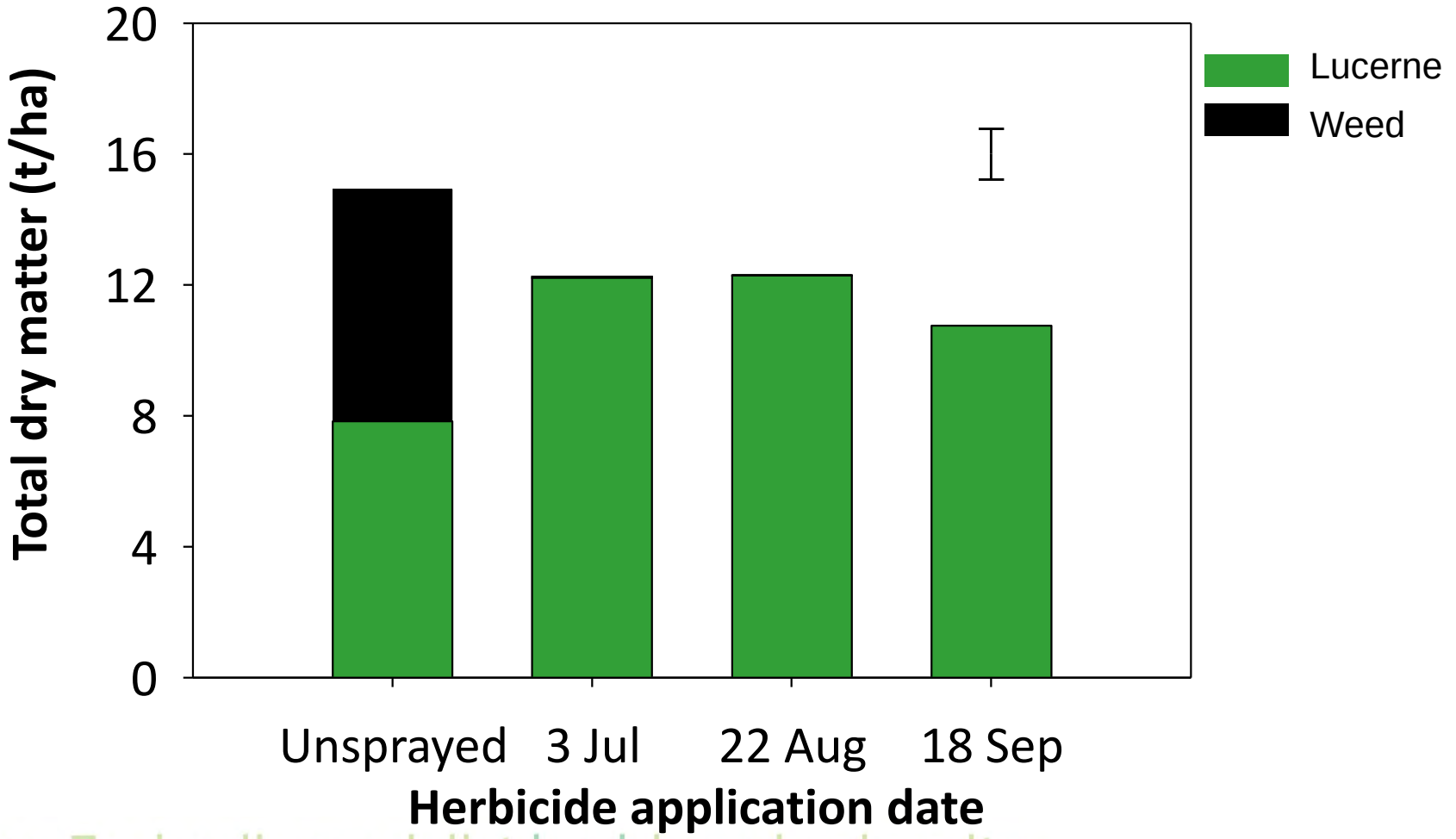
Total annual DM production
- 6 September graze



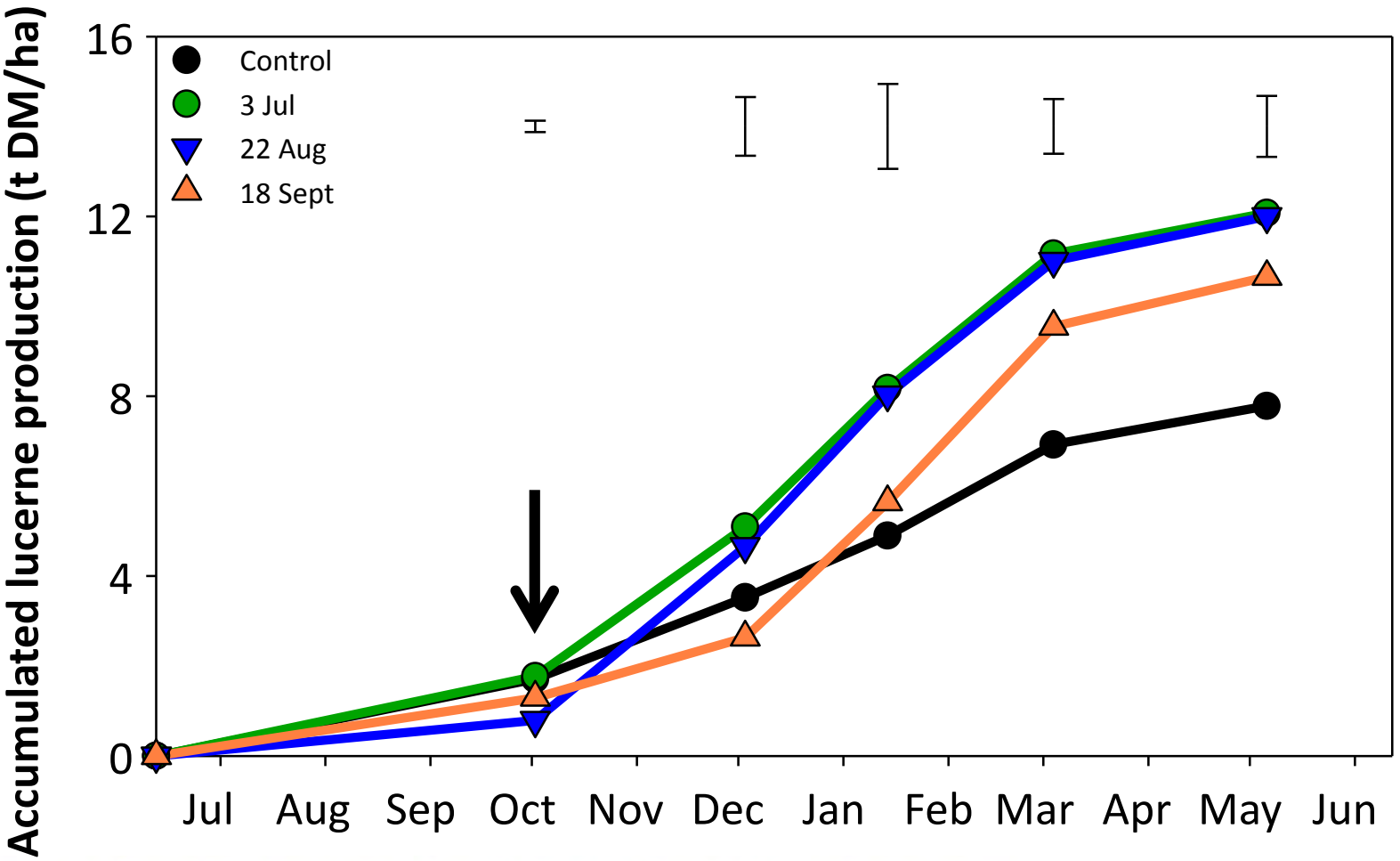
Annual lucerne production
- 6 September graze



Total annual DM production
- 2 October graze



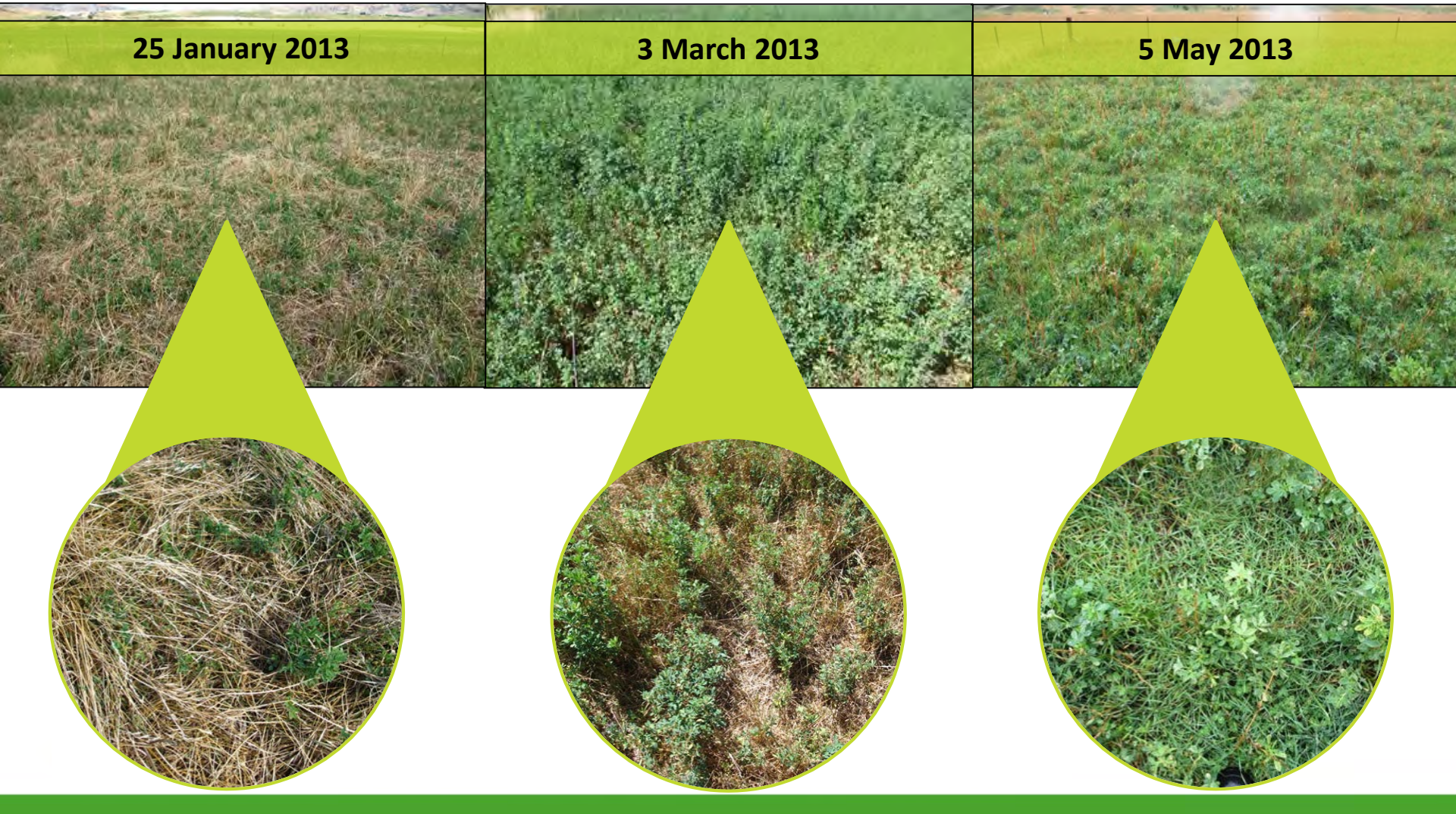
Annual lucerne production
- 2 October graze



Unsprayed control for the 2 Oct grazing treatment

18 September 2012	13 November 2012	14 December 2012
		

Unsprayed control for the 2 Oct grazing treatment (continued)



Plots sprayed 3 July and grazed on 2 October

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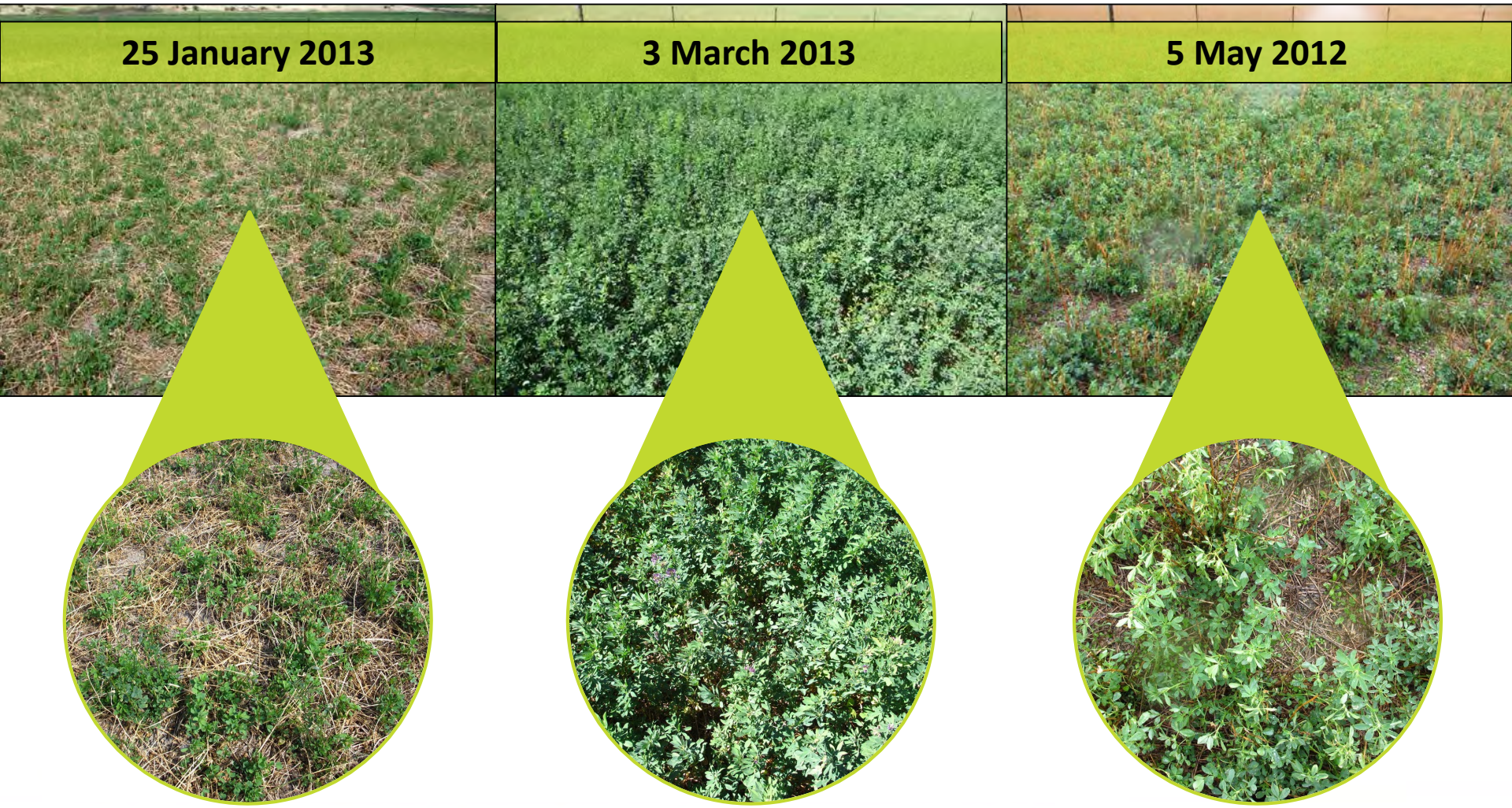
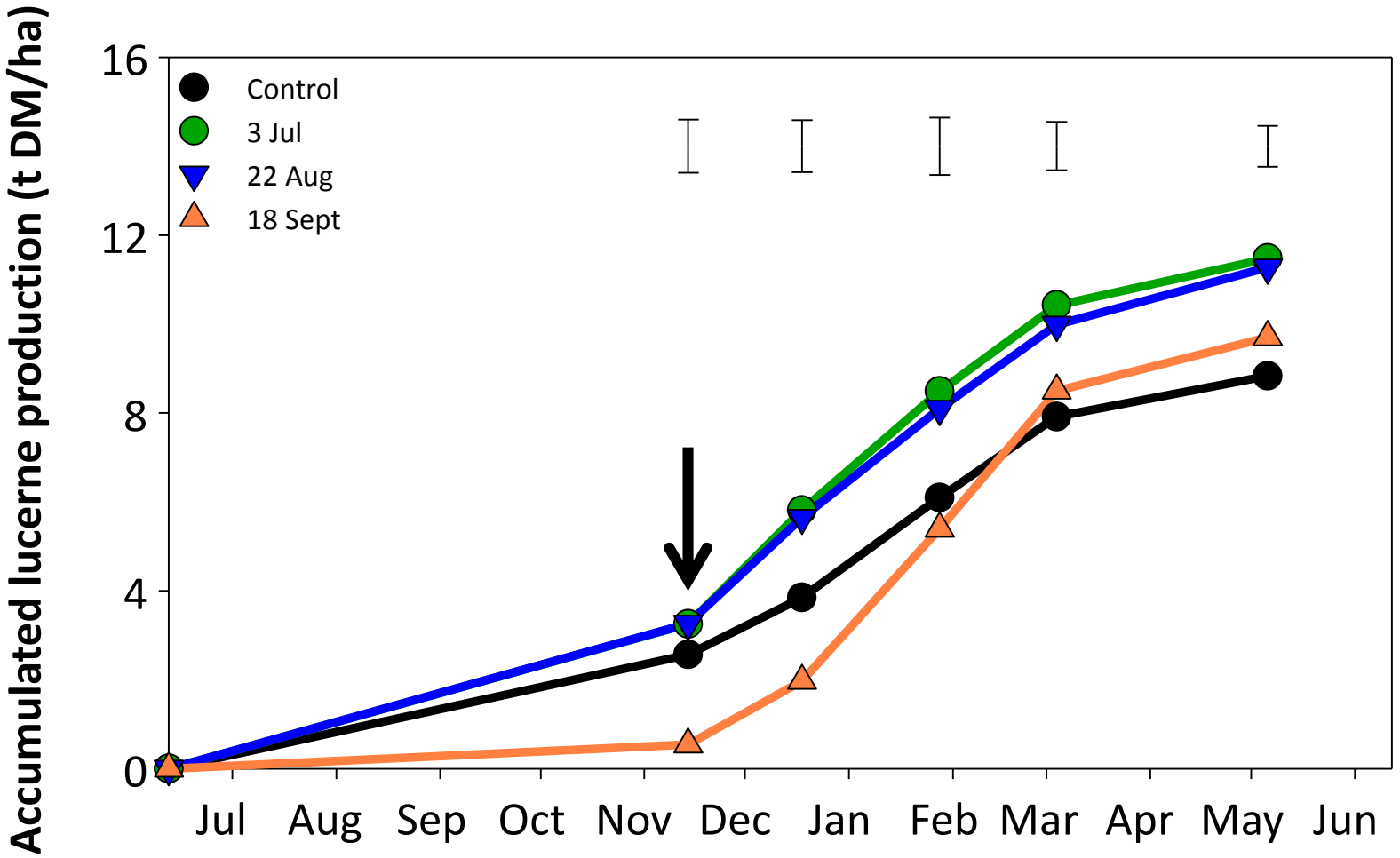
18 September 2012	13 November 2012	14 December 2012
		

Plots sprayed 3 July and grazed on 2 October (continued)

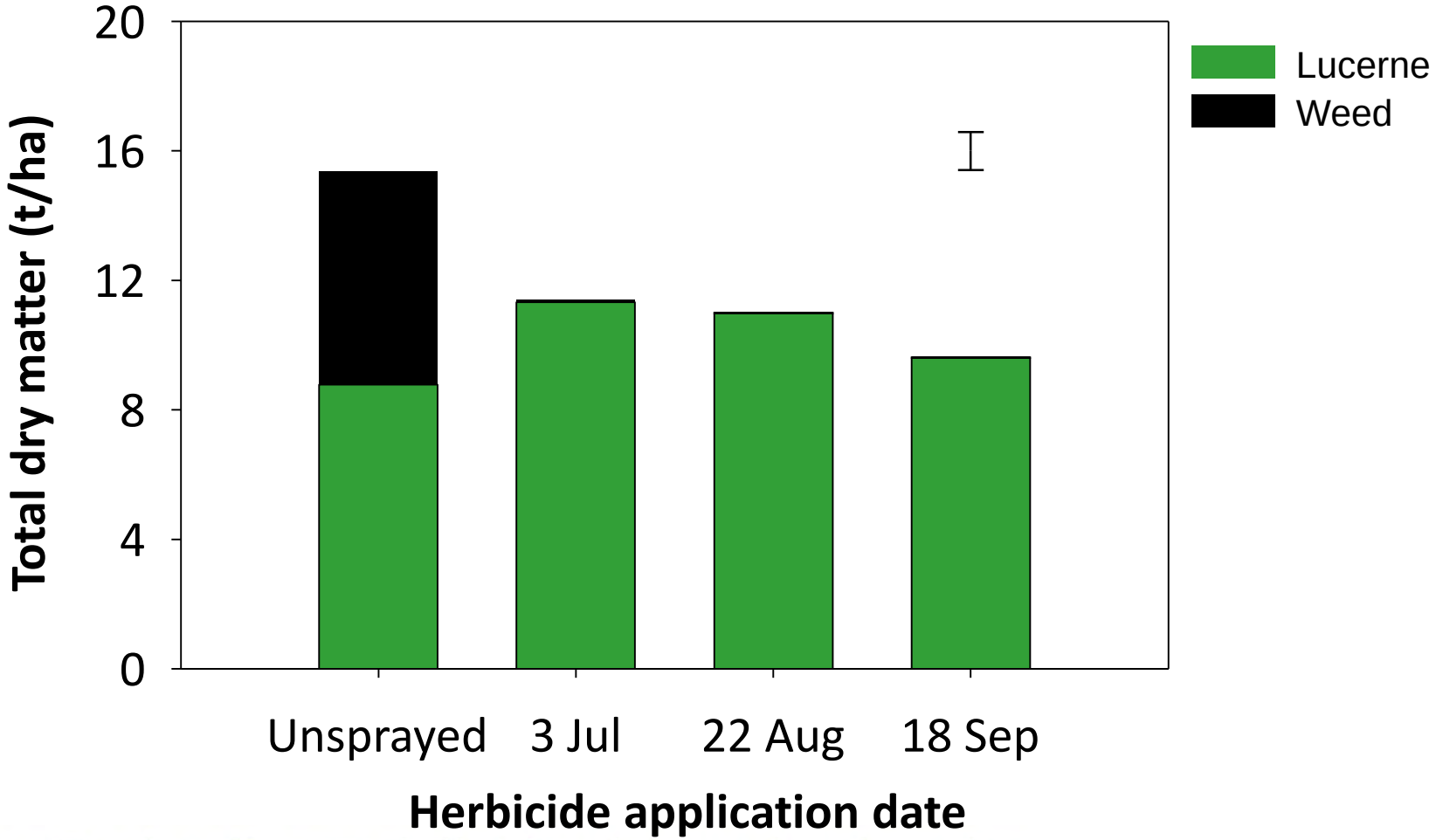


Annual lucerne production
- 14 November graze (hay crop)



Total annual DM production

- 14 November graze (hay crop)



Days from 12 June to reach 4 t/ha lucerne DM

	Grazing treatment		
Application date	6 Sept	2 Oct	14 Nov
Control	220 $_{a}$ (18 Jan)	187 $_{a}$ (16 Dec)	191 $_{b}$ (20 Dec)
3 Jul	170 $_{b}$ (29 Nov)	156 $_{c}$ (15 Nov)	161 $_{c}$ (20 Nov)
22 Aug	168 $_{b}$ (27 Nov)	164 $_{bc}$ (23 Nov)	161 $_{c}$ (20 Nov)
18 Sept	186 $_{b}$ (15 Dec)	186 $_{ab}$ (15 Dec)	213 $_{a}$ (11 Jan)
SED	8.4	10.0	9.9

Phytotoxicity scoring system

EWRS* score	Severity of symptoms	% of crop affected
1	Healthy plant	0
2	Very mild symptoms	0.1 – 2.0
3	Mild but clearly recognisable symptoms	2.1 – 5.0
4	More severe symptoms but no effect on yield	5.1 – 10.0
5	Reduction in yield expected – commercially unacceptable	10.1 – 18.0
6	Reduction in yield expected – commercially unacceptable	18.1 – 30.0
7	Reduction in yield expected – commercially unacceptable	30.1 – 45.0
8	Reduction in yield expected – commercially unacceptable	45.1 – 70.0
9	Heavy damage to total kill – commercially unacceptable	70.1 – 100

* EWRS = European Weed Research Society

Lucerne phytotoxicity scores

	Observation date								
	12 Oct		13 Nov			30 Nov	14 Dec		
	6 Sep	**14 Nov**	**6 Sep**	**2 Oct**	**14 Nov**	**2 Oct**	**6 Sep**	**2 Oct**	**14 Nov**
Control	1.0 $_{c}$	1.0 $_{c}$	1.0 $_{b}$	1.0 $_{c}$	1.0	1.0	1.0	1.0	1.0 $_{b}$
3 Jul	1.0 $_{c}$	1.0 $_{c}$	1.0 $_{b}$	1.3 $_{c}$	1.0	1.0	1.0	1.0	1.0 $_{b}$
22 Aug	4.8 $_{b}$	7.3 $_{b}$	1.8 $_{b}$	2.5 $_{b}$	1.0	1.0	1.0	1.0	1.0 $_{b}$
18 Sept	7.4 $_{a}$	9.0 $_{a}$	4.3 $_{a}$	9.0 $_{a}$	9.0	9.0	1.3	9.0	8.9 $_{a}$
SED	0.71	0.18	0.58	0.38					0.09

Effect of herbicide on lucerne left ungrazed since 12 June

Photo: 18 Sept

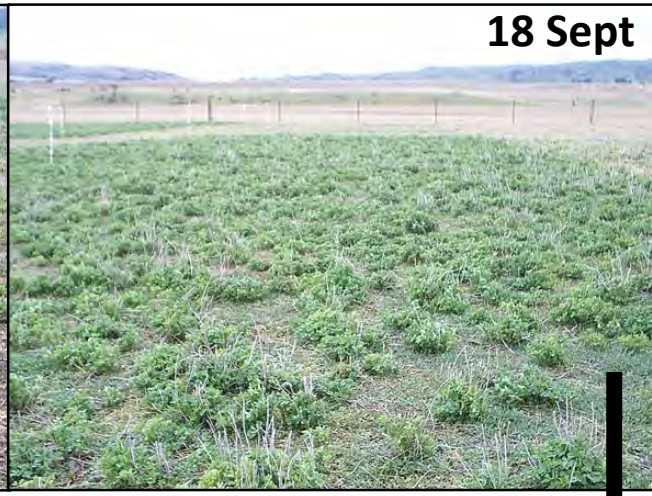


Photo: 12 Oct

No herbicide symptoms apparent in January

24 Jan 2013

Conclusions

- Glyphosate/atrazine successfully controlled weeds
- Damage to lucerne was short lived from September spraying of 100 kg DM/ha (5 cm)
- Dry matter accumulation was delayed by Sept grazing and spraying
- 6 July to 22 August gave highest lucerne yields.

Acknowledgements

Greenfields Ltd

Hills Creek staff

MAF SFF 10-069

References

- Kroschel, J. 2001. A Technical Manual for Parasitic Weed Research and Extension. Kluwer Academic Publishers, Dordrecht, The Netherlands. 256 pp.