Desiccation strategies for white clover seed crops

O.J. Gibson[1], R.J. Chynoweth[1] and M.P. Rolston[2],

[1]Foundation for Arable Research, New Zealand

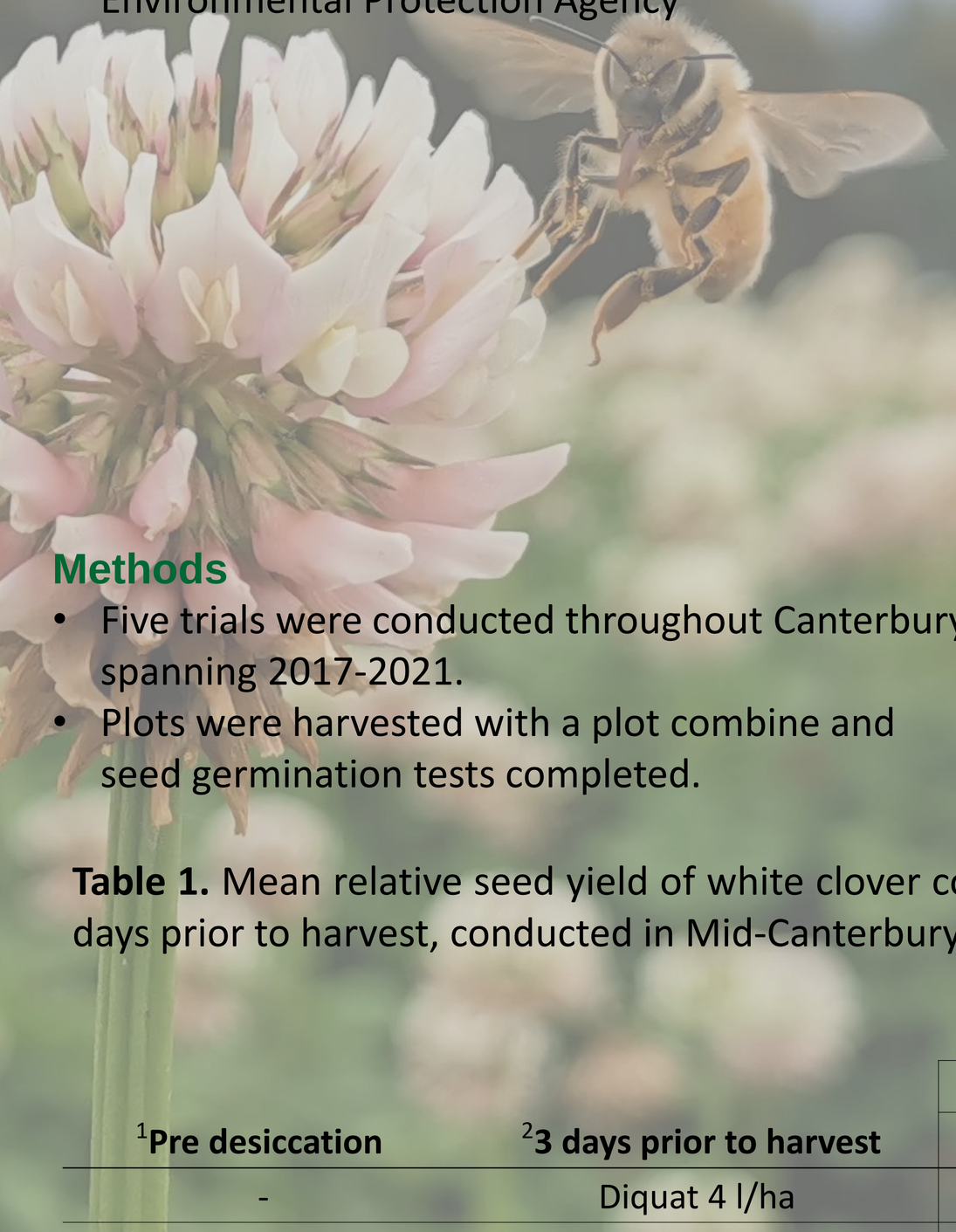
[2]Seed Industry Research Centre, New Zealand

Key points

- Diquat applied alone was one of the highest yielding pre-harvest treatments.
- Alternative products including glufosinate, glyphosate, clopyralid and tribenuron-methyl resulted in similar seed yields to diquat.

Background and objective

- In New Zealand (NZ) white clover (*Trifolium repens* L) is usually direct-harvested following the application of a chemical desiccant.
- Common treatments include a single or double application of Reglone® (200 g/L diquat) and/or MCPA applied as a pre-desiccant.
- Diquat has been removed in parts of Europe, and is under consideration for review by the NZ Environmental Protection Agency



Methods

- Five trials were conducted throughout Canterbury, spanning 2017-2021.
- Plots were harvested with a plot combine and seed germination tests completed.

Results

- White clover seed yield using 4 L/ha diquat ranged from 384 - 850 kg/ha, over the 5 year trial period.
- MCPA as a pre-harvest desiccant did not increase seed yield compared to diquat alone.
- Products including glufosinate, glyphosate, clopyralid and tribenuron-methyl reduced crop re-growth, with up to a 93% decrease in post-harvest DM production.
- Glufosinate applied as a pre-harvest desiccant did not reduce seed yield compared with diquat alone or in diquat-MCPA sequences.
- Fatty-acid and organic desiccant 'GreenMan™' was showed promising signs as an alternative to diquat.
- Windrowing white clover 7 days prior to harvest resulted in a reduction in seed yield. (Note: only 2 years of data was available).

Conclusions

- Alternative products to diquat are effective and available for pre-harvest burnout but come at a cost of post-harvest regrowth.
- Greenman™ shows promise as a replacement for diquat in favorable harvest seasons but is not reliable during difficult seasons.
- At present the product use rate (8% vol.vol) and cost of Greenman™ is uneconomic for large scale applications for white clover desiccation.

Table 1. Mean relative seed yield of white clover compared with the five year mean for 4 L/ha Diquat, applied 3 days prior to harvest, conducted in Mid-Canterbury, NZ.

		% Relative M.D. seed yield compared to Reglone 4 L/ha					
		2018/19	2019/20	2020/21	2021/22	2022/23	**5 Year**
[1]Pre desiccation	**[2]3 days prior to harvest**	Year 1	Year 2	Year 3	Year 4	Year 5	**Average**
-	Diquat 4 l/ha	96	148	110	53	92	**100**
MCPA 2 L/ha	Diquat 4 l/ha	105	160	112	61	83	**104**
Glufosinate 5 L/ha	Diquat 4 l/ha	102	145	114	52	*93[3]*	**101**
Clopyralid 0.35 L/ha	Diquat 4 l/ha	107	153	*122[3]*	68	91	**108**
Glufosinate 5 L/ha	-	*101[3]*	*155[3]*	116	72	77	**104**
-	GreenMan™ @ 8% + oil	98	158	90	35	*82[3]*	**93**
Windrow - 7 days prior to harvest		*76[3]*	116	87	*42[3]*	*73[3]*	**79**
	Mean	98	148	107	55	85	98

[1] Pre desiccation chemicals –MCPA, 750 g/L, MOA group 4, Glufosinate-ammonium, 200 g/L, MOA group 10, Clopyralid, 600 g/L, MOA group 4.

[2] 3 days prior to harvest chemicals – Diquat, 200 g/L, MOA group 22, GreenMan™, 650g/l Fatty Acids extracted from Rapeseed.

[3] Estimated value compared to the mean relative difference to 4 L Reglone.