Knockdown herbicide treatments for sub-tropical grass establishment

Phil Nichols[1, 2,3], Ron Yates[1,2], Geoff Moore[1,2], John Titterington[1,2] Brad Wintle[1,2] and Chris Loo[2,3]
[1]Department of Agriculture and Food WA; [2]Future Farm Industries CRC; [3]School of Plant Biology, The University of Western Australia

Purpose: To determine whether a single knockdown herbicide can be used for successful establishment of sub-tropical grasses to reduce the wind erosion risk from double knockdown applications.

Locations: Gillingarra and Eneabba

Soil Type: Deep sand

Soil Results: (ex CSBP Ltd)

Site	Ammonium N	Nitrate N	P Colwell	K Colwell	S	Organic C	Conductivity	pH (CaCl2)
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	dS/m	pH
Eneabba	3	13	9	43	55.30	1.45	0.089	5.40
Gillingarra	3	57	28	87	173.00	1.64	0.297	5.50

Rotation: Pasture for more than three years

GSR: Gillingarra 182 mm, Eneabba 158 mm

BACKGROUND SUMMARY

The recommended paddock preparation for sowing sub-tropical grasses has been to prepare sites for sowing with two knockdown herbicides, 5-6 weeks before sowing and again 2 weeks before sowing. However, this can leave sandy soils very prone to wind erosion during spring. Experiments were conducted to determine whether a single knockdown herbicide application 2 weeks prior to sowing could be used on erosion-prone soils to minimize soil erosion and obtain successful grass establishment.

TRIAL DESIGN

An area of 48 m x 48 m was sown to the Evergreen mix @ 5 kg/ha (40% germinability) with an experimental cone seeder using half wide point (8 inch) tynes spaced 550 mm apart. The area was sprayed in 6 m widths alternatively with one or two knockdown sprays (4 replicates). The first knockdown herbicide (glyphosate @ 2 L/ha) was sprayed 6 weeks before sowing on the double knockdown plots, while the second spray (glyphosate @ 1.5 L/ha) was applied to all plots on August 19 (2 weeks before sowing). Plastic tags, 90 mm long, were placed at sowing in random locations in the bottom of seeding furrows of both herbicide treatments (64 per site) to measured the amount of sand infill. Seedling counts were conducted in 1 m sections along the row of each tag. Measurements were made after 29 days at Eneabba and 42 days at Gillingarra.

RESULTS

Establishment densities were higher at both sites following the double knockdown treatment (Tables 1 and 2). Sand infill was less with the single knockdown treatment, but these differences were not statistically significant.

Table 1 *Establishment density and seed infill into sowing furrows of warm season perennial grass seedlings following one or two pre-emergent knockdown herbicide applications at Gillingarra*

Treatment	Seedling density (plants/m^2)	Sand infill into furrows (mm)
One knockdown	26.0	8.6
Two knockdowns	42.9	10.6
Probability of no difference	$P < 0.05$	Not significant

Table 2 *Establishment density and seed infill into sowing furrows of warm season perennial grass seedlings following one or two pre-emergent knockdown herbicide applications at Eneabba*

Treatment	Seedling density (plants/m^2)	Sand infill into furrows (mm)
One knockdown	8.0	7.6
Two knockdowns	16.8	7.4
Probability of no difference	$P < 0.001$	Not significant

DISCUSSION

Although a single knockdown treatment resulted in lower establishment density, plant numbers were still adequate. This method could be used by farmers concerned about wind erosion or who want to maximise winter grazing from their paddocks prior to sowing sub-tropical grasses, provided they optimize other key factors for establishment, such as sowing depth, use of furrows and press wheels and using good quality seed. The higher establishment density from the double knockdown pre-emergent herbicide regime presumably results from more accurate seed placement, due to greater breakdown of soil organic matter. Indeed, it was noticeable that the double knockdown treatment at both sites resulted in a very clean, weed-free seedbed with little plant residue, while the single knockdown treatment resulted in a more cloddy seed bed, due to the soil being held together by un-decomposed roots. The single late knockdown is also likely to leave less soil water available to newly sown perennial grasses, which may impact on establishment success. This may be an important factor in dry winters and springs.

These results need to be treated with some caution as spring conditions in 2009 were highly favourable and sites were not subjected to major wind erosion events. Spraying regimes need further fine-tuning to find the optimum between maximising establishment success and minimising the potential for soil erosion, particularly under different seasonal conditions during the establishment phase.

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PAPER REVIEWED BY: Ron Yates

EMAIL CONTACT: phil.nichols@agric.wa.gov.au