DEPARTMENT OF
PRIMARY INDUSTRIES

Chilean needle grass

Field day fact sheets **November 2008**

Research update November 2008

Regional Best Practice Management

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Regional Best Practice Management

Chilean needle grass Research updates November 2008

Basis

Previous studies have identified that the seed production of Chilean needle grass (*Nassella neesiana*, CNG) appeared to be sensitive to rainfall. It is likely that the variation in plant vigour due to climate may affect management.

Aims

1. To continue and conclude the treatments in the network of demonstration trial sites throughout the Australian range of CNG.
2. To raise awareness of management options available to community groups within the range of CNG.
3. To update best practice management guides for CNG.

Setup

Four 'on farm' demonstration trials of management techniques for CNG have been established. These cover the plants' distribution ranging from Greenvale and Toolleen (VIC) through to Goulburn and Glen Innes (NSW). The Greenvale site was established during autumn 2003. The techniques, selected in collaboration with the local community, focus on reducing seed production, minimising seedling germination and raising the feed utilisation of CNG.

Greenvale 'The Elms'

With thanks to the late Ian & Margaret Souter, together with John & Alan McKenzie

The Greenvale site is situated on the northern outskirts of Melbourne. The site has an average rainfall of 535.8 mm per year with only 238.7 mm falling in 2007. Up to the 10th of November 2008 the site has received 240.5mm of rain. The soil at the site is a clay loam and the soil test results can be found in Table 1. In the past the site has been used to graze cattle and sheep. CNG was first noticed on the site in the mid 1980's. It is believed that CNG first entered the site by the Moonee Ponds Creek. The CNG has since been spread by sheep grazing.

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Table 1 – soil test results taken autumn 2003

Variable		Greenvale
pH (1:5 water)		5.57
Phosphorus (Olsen P) mg/kg		10.33
(Bray) mg/kg		8.00
Potassium (Skene) mg/kg		110.00
Sulfur (CPC by ICP) mg/kg		8.00
Sodium (NH4OAc exchange) meq/100g		0.80
Calcium of cations	%	46.00

Treatments

Table 2 – treatments applied for regional best practice Greenvale

Treatment	Grazing	Seed & Fertiliser	Herbicide
1	Set stock	No	No
2	Set stock	No	Flupropanate
2A	Set Stock	No	Reapplied 2007
3	Lock Up	Yes	Glyphosate
4	Lock Up	Yes	No
5	Lock Up	No	Flupropanate
5A	Lock Up	No	Reapplied 2007
6	Lock Up	No	No
7	Strategic	Yes	Glyphosate
8	Strategic	Yes	No
9	Strategic	No	Flupropanate
9A	Strategic	No	Reapplied 2007
10	Strategic	No	No

Herbicide	Resow plots, glyphosate at 2l/ha (540g a.i./ha) prior to sowing (Autumn 2004) Other spray plots, flupropanate at 1.5l/ha (1117.5g a.i./ha) in July 2003 Split plots, flupropanate reapplied at 1.5l/ha (1117.5g a.i./ha) in August 2007
Grazing	Strategic: grazing as needed to limit CNG seed production whilst maintaining ground cover (approximately 300 DSE/ha for 3 days) Lock Up: grazing exclusion Set Stock: Background grazing at district average stock rate (12 DSE/ha)

Note: Grazing ceased over the summer period of 2003/04 duE to low pasture mass and groundcover. Grazing resumed in April 2004.

Seed & Fertiliser	Pasture seed and legumes over sown existing pasture – May 2004. (Sirosa & Holdfast phalaris, Victorian Ryegrass, Vision Cocksfoot, Trikkala & Goulburn Cocksfoot, with 50kg/ha DAP)

Seasonal Measures

Vegetative composition measured using 100 point (1m x 1m) pasture comb taking basal observations

Classifications	Chilean needle grass	Legumes
	Desirable perennial grasses	Vegetative Litter
	Annual grasses	Bare Soil
	Broadleaf weeds (perennial and annual)	
	Rock	

Initial pasture composition was:

11% CNG	7% Perennial desirable
59% Vegetative Litter	0% Annual grasses
21% Bare Soil	2% Broadleaf weeds
0% Rock	

Occurrence of seedlings measured using 25cm x 25cm quadrat

Results:

Effect of spraying with Flupropanate

- Significantly reduced the number of CNG stems when compared to unsprayed ($P<0.001$) for a period of 12 months.
- Significantly increased broadleaf weeds when compared to unsprayed ($P<0.001$).
- The selectiveness of flupropanate was variable and resulted in damage to phalaris and perennial ryegrass leading to bare ground.

Effect of the reapplication of Flupropanate

- Reapplication reduced CNG basal cover when compared to the plots with only one treatment of flupropanate (Figure 1).
- The re-application of flupropanate further reduced the basal cover of annual grasses while increasing the basal cover of broadleaf weeds and amounts of bare soil.

Effects of spraying with Glyphosate

- Glyphosate quickly browned out CNG tussocks however the CNG regrew 6-12 months post application.

Effects of set stocking

- Set stock grazing reduced the desirable grass basal cover leading to bare ground increased basal cover of CNG.
- There is a decreased amount of vegetative litter which is thought to have lead to a reduced residual effect of the flupropanate through loss of the top soil containing the flupropanate.

Effects of strategic grazing

- Strategically grazed plots had less standing CNG seedheads at the end of spring, and a greater cover of desirable grass species.

Effects of Oversowing

- The oversowing treatements failed to reduce the basal cover of CNG through pasture competition.
- Drought conditions at the time of oversowing may have reduced the effectiveness of this treatment.

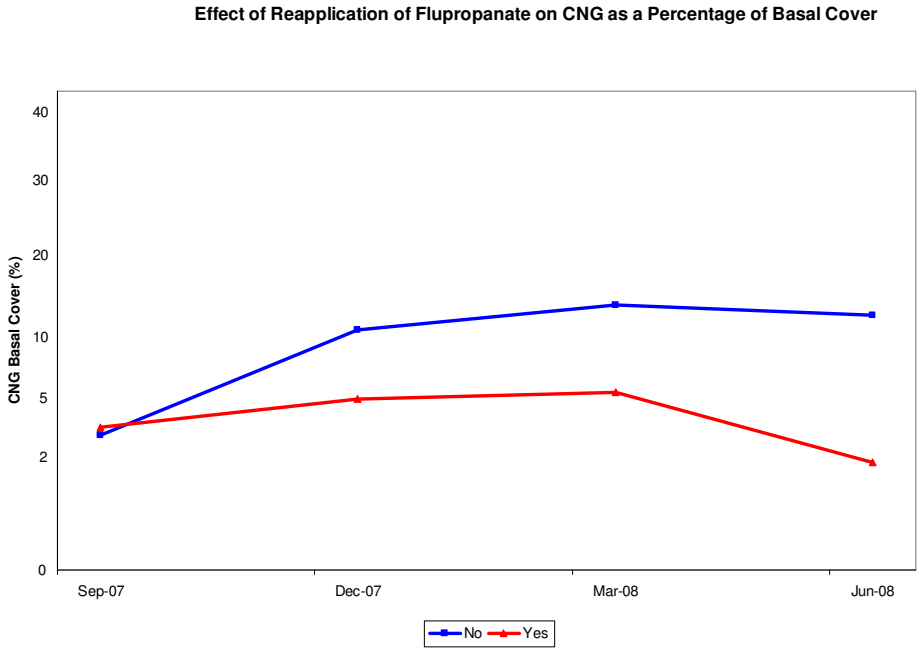

Figure 1 – Effect of Reapplication on CNG as a Percentage of Basal Cover

Comparison Flupropanate Re-application (Split Plots) with Set Stocking and Strategic Grazing

Results of flupropanate re-application (split plots):

- Flupropanate reapplication significantly reduces CNG basal cover. (Figure 2).
- The desirable perennial grasses basal cover has been maintained during this time in the reapplied plots (Figure 3). **Note:** As there is no recruitment of desirable perennial grasses, the reduction in CNG has lead to an increased amount of vegetative litter and bare soil in the plots.
- The plots which have been set stocking grazed had a higher rate of CNG than those plots strategically grazed.
- The set stock plots also had a reduced basal cover of desirable perennial grasses than those plots with strategic grazing.

When the two grazing methods are compared, the strategically grazed plots have a lower amount of CNG, higher amount of desirable perennial grasses and less vegetative litter and bare soil that those plots with set stock grazing (Figure 4).

Note: Statically there is no difference between the strategically grazed and lock up plots treated with flupropanate. (The strategic plot data in the graphs is a combination of both the lock up and strategically grazed plots.)

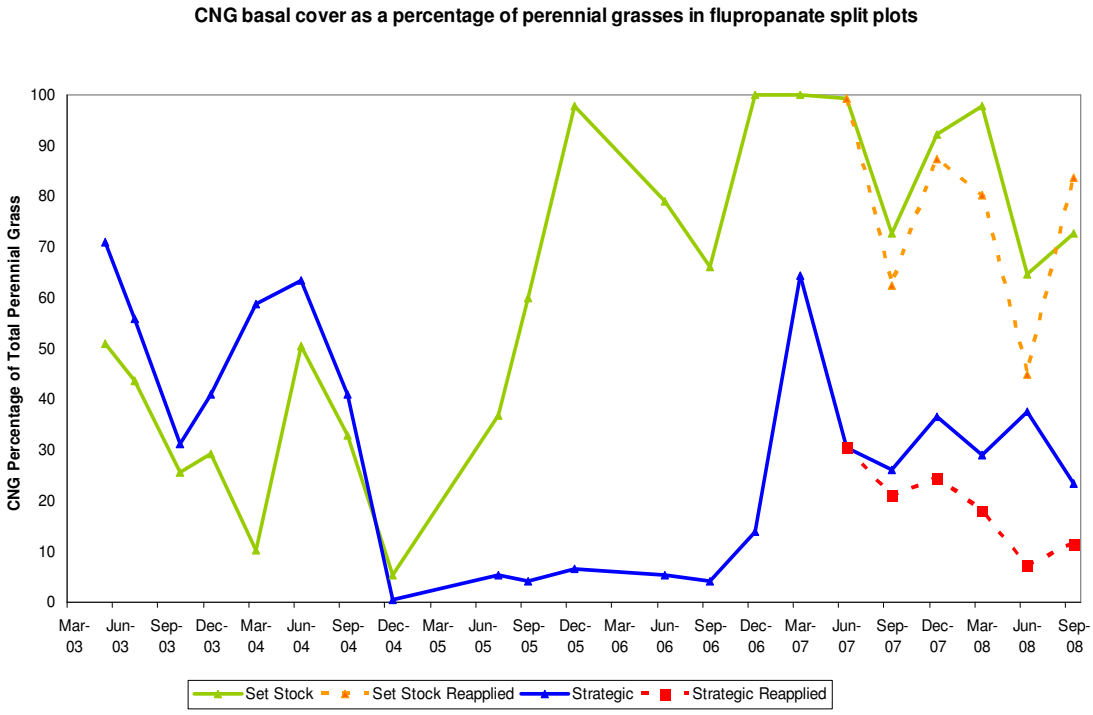

Figure 2 – CNG basal cover as a percentage of perennial grasses in flupropanate split plots

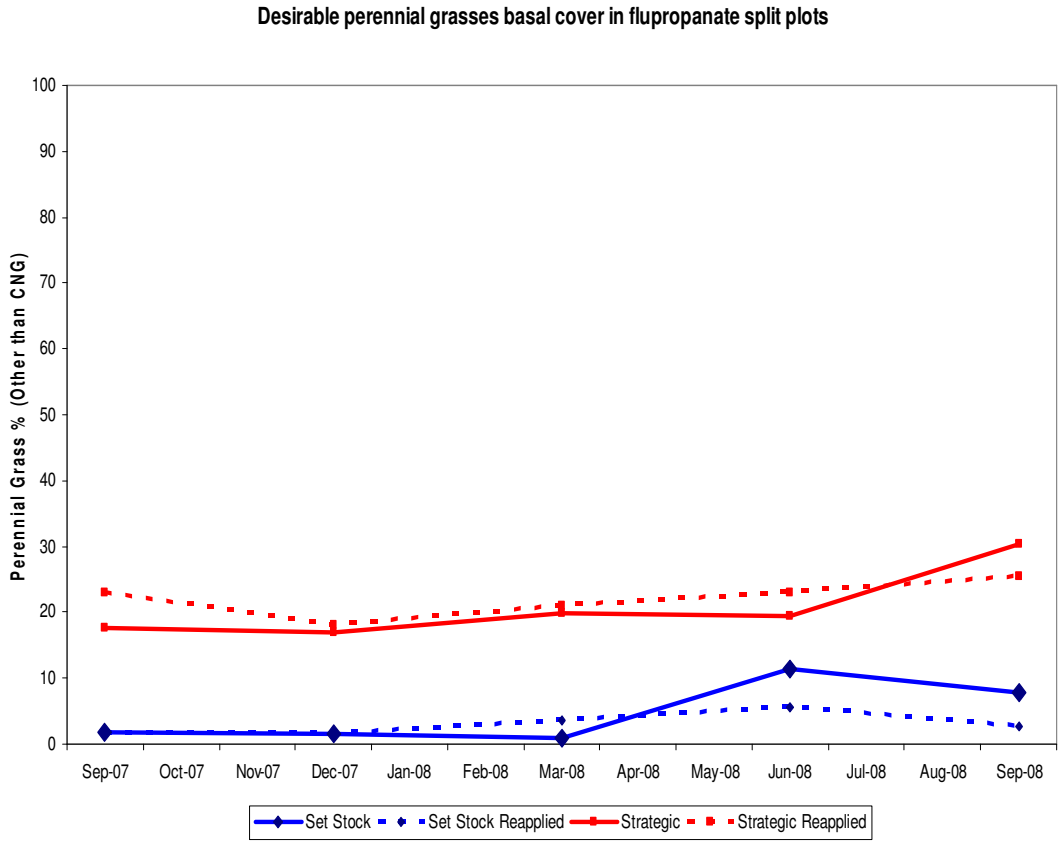

Figure 3 – Desirable perennial grasses basal cover in flupropanate split plots

March 2008 strategic

June 2008 strategic

September 2008 strategic

March 2008 set stock

June 2008 set stock

September 2008 set stock

Figure 4 – Visual comparison of set stock and strategically grazed split flupropanate plots (Greenvale)

Management Implications

Sheep are reluctant to eat CNG seedheads that have emerged from the stems

- · Reduced CNG panicle seed production will only occur if sheep are 'strategically grazed' prior to the seedhead emerging from the stems.
- · Sheep will tend to overgraze paddocks rather than eat CNG after seedhead emergence. Overgrazing occurs because the CNG becomes less palatable than the desirable grasses that are eaten down to the ground.
- · Grazing needs to be integrated into a whole infestation management plan such that seed is not allowed to mature in non-grazed areas. Other strategies could include spraytopping, slashing, or burning.

Seed spread and Animal welfare

- · Shearing will not remove all CNG panicle seeds. CNG panicle seeds are still likely to be present in the skin and can drop out in transport or into clean paddocks.

DO NOT continually graze areas that have been sprayed with flupropanate

- · Areas will have reduced ground cover due to dead CNG plants leading to bare ground – this can lead to seasonal fluxes of broadleaf weeds (e.g. thistles) and annual grass weeds
- · 'Strategic grazing' needs to be used to allow desirable species to grow and fill the gaps.
- · 'Continually grazed' areas were quickly re-infested with CNG when compared to those that were 'strategically grazed.'
- · Adequate pasture and ground cover needs to be maintained to ensure residual activity of the flupropanate in the soil – e.g. such that soil particles do not move or get washed away in floods.

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