Grazing management for the long term utilisation and control of Chilean needle grass (*Nassella neesiana*)

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CRC Weed management

The Cooperative Research Centre
for Australian Weed Management
South Australia

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Helping Communities Helping Australia
A Commonwealth Government Initiative

Natural Heritage Trust
Commonwealth Government
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Statement of Authorship

I certify that the substance of this thesis has not already been submitted for any degree and is not currently being submitted for any other degrees or qualifications.

I certify that any help received in preparing this thesis, and all sources used, have been acknowledged in this thesis.

Signature [redacted] Date 17 July 2007

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Abstract

Chilean needle grass (*Nassella neesiana* (Trin. & Rupr.) Barkworth, CNG) is a tufted perennial that is becoming a serious pasture and environmental weed in south eastern Australia. It is indigenous to South America and was first recorded in Australia in the early 1930s. CNG is a perennial stipoid grass found in winter and summer rainfall dominant areas and produces a sharp spear grass type panicle seed, as well as cleistogene seeds within the stems and base of the plant. Once CNG becomes reproductive it has limited feed value, and the sharp panicle seeds become a grazing welfare risk as they attach readily to livestock and can penetrate their skins and eyes. Stock also become a vector for spreading CNG seed. The distribution of CNG within New South Wales and Victoria has expanded rapidly since the 1990s, replacing desirable pasture species in farmland, and degrading native conservation areas. Many conventional means of control have not been successful in managing CNG. This thesis investigates grazing management strategies in combination with chemical control and pasture rehabilitation for long-term management of CNG.

Glasshouse and field trials within the range of CNG were established to investigate management strategies to maximise the usefulness of CNG for animal production whilst limiting its ability to reproduce and spread. Field trials were conducted over multiple growing seasons as small plot and full paddock experiments on farms ranging from Glen Innes (New South Wales) to Greenvale (Victoria) with managed grazing, herbicide spraying and pasture renovation systems using sheep and cattle. Practicality issues meant that goats could not be included in sheep and cattle grazing comparisons

Feed test analysis of harvested plant samples over 2 growing seasons showed that CNG was able to be utilised by grazing stock. This was while CNG was in its vegetative stages during the cooler winter months, but its palatability was still below cocksfoot, *Dactylis glomerata*, that is only considered of modest palatability. Field grazing trials showed that once CNG becomes reproductive, stock will avoid eating it, even at stocking rates of 300 DSE/ha. Set stock grazing of CNG infestations, especially after treatment with flupropanate, led to bare ground, annual grass and broadleaf weed invasion as well as rapid

re-infestation of CNG when compared with strategic grazing systems. Rotational or strategic grazing is only useful as a management strategy to reduce CNG seed production if the infestation represents an area that can be grazed in the 2 week window between seedhead development and panicle emergence. For rotational grazing to be beneficial, the rotation needs to be timed such that the active grazing cell begins in the infested area at or just prior to seedhead development. After panicle emergence, both sheep and cattle were reluctant to graze the CNG reproductive tillers and CNG was able to produce seed. Cattle were able to eat more CNG panicle seeds than sheep, and were less likely to be contaminated with CNG seed.

During the dry seasonal period of the experimentation, conventional cropping in the Northern NSW region was successful in reducing CNG infestations. Pasture renovation was not successful in managing CNG. A pot trial showed that as seedlings, *Phalaris aquatica* responded better to increased phosphorus than CNG. However, mature CNG plants responded as well as *Phalaris aquatica* and grew more in soil with increased phosphorus suggesting that fertility alone may not be a useful tool for managing CNG.

Given the limited ability of grazing to reduce seed production, and low levels of competition generated by pasture renovation, future control strategies need to address alternative methods of seedbank destruction and seedhead avoidance, especially in areas that cannot be grazed prior to seedhead emergence (e.g. mechanical slashing, chemical topping/spray grazing, chemical wiping, burning). The use of cropping suited to different regions and the ability to use alternative herbicides to control CNG is also a major gap in the knowledge of how to control CNG.

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