Effect of clipping and fertiliser addition on the feed value of Chilean needle grass (*Nassella neesiana*) during reproductive growth stages

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Summary Concern about the invasion of pastures in southeastern Australia by Chilean needle grass (*Nassella neesiana* (Trin. & Rupr.) Barkworth) began to mount in the 1970s. Native to temperate South America, Chilean needle grass can completely overrun pastures resulting in canopy cover of up to 60%. Such infestations lead to a substantial reduction of stock carrying capacity during late spring and summer when the weed produces large quantities of unpalatable flower stalks. By the 1990s many farmers in New South Wales and Victoria found that they had expanding cover of Chilean needle grass on their properties. Moreover, the weed has been invading conservation areas comprising native grasslands, grassy woodlands and riparian vegetation in many areas.

The main problem encountered in the management of pastures dominated by Chilean needle grass is the production of large numbers of unpalatable flower stalks during summer, which are actively avoided by stock, and have sharp seeds which can penetrate the hides of sheep. As *N. neesiana* is palatable for much of the year, grazing management of this species has been identified as a potential management tool requiring investigation. The project aims to maximise the feed utilisation of Chilean needle grass, whilst limiting the production of viable seeds, using a range of cultural techniques and grazing strategies that incorporate different classes of stock. This paper describes an experiment that evaluated the feed value of Chilean needle grass, when compared with cocksfoot (*Dactyliis glomerata* L.), under clipping and fertiliser regimes during the reproductive growth stages.

Regrowth of both Chilean needle grass and cocksfoot plants was analysed for crude protein (percentage of dry matter; CP), metabolisable energy (MJ kg$^{-1}$ dry matter; ME), digestible dry matter (percentage of dry matter; DDM), neutral detergent fibre (percentage of dry matter; NDF), and total plant dry matter (percentage of wet weight; DM). Both species in the clipping treatment had significantly greater amounts of CP, ME and DDM (all P < 0.05) than in the unclipped treatment. The quality of cocksfoot was generally higher than Chilean needle grass. This difference became significant at day 63 (all P < 0.005), with only CP remaining significant at day 78 (P < 0.005). Both species in the clipping treatment had significantly less NDF and total plant DM (both P < 0.05) than the unclipped treatment. Chilean needle grass had greater amounts of DM and NDF when compared to cocksfoot at day 37 and 63 respectively (both P < 0.05).

Chilean needle grass regrowth at day 63, in the clipped and fertilised treatment (92 kg N ha$^{-1}$, two split applications), had significantly more CP, ME and DDM, and with significantly less NDF (all P < 0.05), than Chilean needle grass plants of the unfertilised clipped treatments. Cocksfoot plants were more responsive to the initial nitrogen fertiliser application, with regrowth from day 37 having significantly greater amounts of CP, ME, DDM, and with significantly less NDF (all P < 0.05), when compared to the unfertilised clipped treatments. Cocksfoot was more responsive to the addition of fertiliser. Cocksfoot regrowth, from the clipped and fertilised treatment, had significantly more CP following each fertiliser application than regrowth of Chilean needle grass plants in the clipped and fertilised treatment (P < 0.05).

The effects of clipping and fertiliser addition significantly improved the feed value of Chilean needle grass, making the grass more palatable and potentially able to be utilised in a rotational grazing system. However, in comparison with cocksfoot, the feed quality of Chilean needle grass was generally lower and less responsive to the addition of nitrogenous fertiliser.

Keywords Chilean needle grass, cocksfoot, nitrogen fertiliser, feed value.