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## Forb Responses to Varying Grazing Regimes in Australian Native Temperate Grasslands

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The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

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## Forb responses to varying grazing regimes in Australian native temperate grasslands

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**Key words :** sheep, grazing-rest, exclosures, wildflowers

**Introduction** Australian temperate grasslands have been subjected to extensive clearing for agricultural and urban development for over 100 years. They are now one of the most endangered ecological communities in Australia. Forbs, non-woody plants other than grasses, sedges and rushes, contribute significantly to the species richness of native grasslands. They have been particularly depleted in fertilised grasslands used as pasture. While livestock grazing has been a major driver in the decline of native grassland quality and extent (Garden *et al.*, 2003), strategic resting from grazing can be used by land managers to target vulnerable or strong life history phases of unfavourable and favourable species (Ash and McIvor 1998).

**Materials and methods** In July 2003 an open communal grazing design was established at three sites across south western Victoria (Kemp and Dowling 2000). The exclosures were divided into 18 plots (each 15 m × 15 m), composed of three replicates of six grazing-rest treatments: *no rest*, *always rested*, removing sheep during the winter (*winter rest*), removing sheep during the spring (*spring rest*), removing sheep in the summer (*summer rest*) and removing sheep in the spring & summer (*spring-summer rest*). In spring 2006 forb richness was measured in each treatment plot by searching for about 30 minutes to produce a forb species list. Responses to treatments were analysed using analysis of variance. We used a multiplicative model which included site and treatment as explanatory variables. We included a site-treatment interaction term as an explanatory variable accounting for when the effect of treatment differed according to site.

**Results and discussion** Forb richness was most significantly correlated with site (mean  $\pm$  s.e.,  $n=18$ :  $17 \pm 1$ ,  $13 \pm 0.5$ ,  $12 \pm 0.8$ ). The sites had similar management histories of no cultivation, fertiliser or exotic species sowing and had not been burnt for at least 60 years if ever. Although stocking rates were supposed to be similar throughout the experimental period this was not the case. The site with the highest stocking pressure experienced the largest deficit in terms of average rainfall. Perhaps not surprisingly this was also the site with the lowest species richness. The site with the highest species richness had medium stocking pressure, received its typical rainfall in the previous years but most importantly was surrounded by larger remnants of higher quality grassland.

Resting pastures in spring resulted in the highest species richness. This reflects a trade-off between allowing species to grow and reproduce in spring while disallowing over-dominance by a few strong species. Complete rest from grazing resulted in high levels of species richness at only site due to disruption of the treatment at the other two sites by burrowing native rats (*Rattus lutreolus*). Treatment plots that were never rested from grazing had the fewest species.

**Conclusions** Overall site richness was a result of interactions between landscape factors such as distance to seed sources as well as local factors such as stocking pressure and rainfall. Resting pastures from grazing, particularly in spring, resulted in higher numbers of native forbs species.

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