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

*Turner , V . and Zimmer , H . Arthur Rylah Institute for Environmental Research , Department of Sustainability and Environment , PO Box 137 Heidelberg , Victoria 3084 , Australia . E-mail : vivienne .turner@ dse .vic .gov .au*

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**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 +/-s .e . , n=18 : 17+/-1 , 13+/-0 .5 , 12+/-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 .

**References**

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