

Grazing management for biodiversity and production outcomes on the Volcanic Plains of Western Victoria -An Ecological Sustainable Agriculture Initiative Project (ESAI).

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Background

Victoria's grassy communities have been severely altered through 150 years or more of grazing and cultivation. A dramatic decrease in plant and animal diversity and a subsequent shift in plant species dominance from tall warm season native perennials such as Kangaroo Grass (*Themeda triandra*), to shorter cool season native perennials (eg. *Austrodanthonia* spp.) and exotic annual and perennial grasses (eg. *Vulpia* spp. & *Phalaris* spp.) is clearly evident. A loss of ecosystem stability in the form of fluctuating water tables, salinity, erosion and exotic species invasion has also been recorded and is considered a serious threat to landscape ecosystem function.

Native grasslands are often considered less productive than their exotic counterparts. However in recent times an increase in awareness of their intrinsic, functional and economic value has been observed and a concerted effort is now underway to retain and manage our native grasslands.

Project Description

The Ecologically Sustainable Agriculture Initiative (ESAI) Grazing for Biodiversity and Profit project is a joint initiative between the Department of Sustainability and Environment and the Department of Primary Industries. It aims to achieve a more socially and environmentally acceptable balance between biodiversity and agricultural productivity in native grasslands and grassy woodlands that remain on Victorian farms. The four-year project (2001-2005) involving both social and ecological research, aims to provide farmers and other land managers with current information and associated skills required to manage their native grasslands and thus enhance biodiversity and ecosystem stability. To date the project has undertaken a detailed review of current literature on grassland management for biodiversity conservation (Dorrough *et al.* 2004) and market research to ascertain the attitudes and concerns of farmers in regard to the conservation and management of their native grasslands (Watson and Pryor 2002).

Grazing Management Trials

The field component of the Volcanic Plains study aims to examine the role of timing and duration of 'resting' on native and exotic plant cover, diversity and habitat structure. Resting is a grazing management tool whereby grazing is excluded during strategic periods of the year (Kemp *et al.* 2000). Evidence suggests that the exclusion of grazing at particular times of the year may promote an increase or decrease in the abundance of particular groups of species (Dowling *et al.* 1996). For example it has been suggested that exclusion from grazing during spring, a peak flowering period for many native forb species, may benefit the persistence of this functional group by allowing seed-set and seed-fall to occur (Kemp *et al.* 2000; Tremont and McIntyre 1994). In contrast summer exclusion may promote the cover of perennial grasses through increased survival rates of existing plants and increased seedling establishment (Dowling *et al.* 1996). Resting over summer months may also reduce bare ground cover and associated effects such as erosion.

Three grassland sites across the Victorian Volcanic Plain were chosen with two sites located on private land at Birregurra and Darlington and one site at the Department of Primary Industries research institute at Hamilton.

All three sites were characterised by a reasonably high native species cover (>50%), common exotic species include Rats Tail Fescue *Vulpia* spp., Canary Grass *Phalaris* spp. and Onion Grass *Romulea* spp. An open communal grazing design was used so that plots could be opened and closed to grazing as required and no continuous shifting of animals was necessary. The six treatments are 1) spring rest (peak flowering period), 2) summer rest (peak fruiting period), 3) a combined spring and summer rest, 4) winter rest (period of establishment for some exotic species, high rainfall), 5) continuous grazing (set stocking) and 6) no grazing. There are three replicates of each treatment at each site.

Extensive bare ground in grazing landscapes has been associated with environmental degradation in the form of erosion, increased run-off and exotic weed invasion, particularly by annual species (Virgona *et al.* 2000). The graph below illustrates the proportion of bare ground recorded at the end of summer 2004, across the range of treatments at one site. The combined spring/summer rest and grazing exclusion treatments resulted in substantially less bare ground when compared to the individual spring and summer rest, winter rest and always grazed treatments. This suggests that the combined spring/summer rest plots and the grazing exclusion plots may result in less erosion, runoff and exotic species invasion or abundance than the remaining treatments. Another important point to consider however is that resting during the spring or summer, a period of peak flowering and fruiting, may result in a greater establishment of native forbs and grasses than the other treatments, including no grazing. These concepts will be explored as more data are collected at the site and analysed statistically.

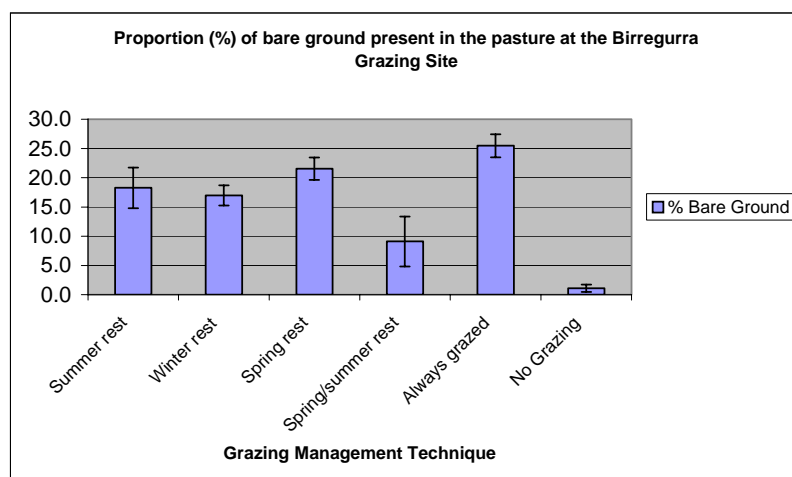


Figure 1. Mean proportion of bare ground present for each of the 6 treatments (%), measured after a summer rest. The grazing trial had been running for 9 months.

For more information contact Jaimie Mavromihalis or Josh Dorrough at the Arthur Rylah Institute, Department of Sustainability and Environment, email Jaimie.Mavromihalis@dse.vic.gov.au. See also the Arthur Rylah Institute website for information regarding this study and others.

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