Valuing the Pasture Resource - Importance of Perennials in Higher Rainfall Regions of South Eastern Australia

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VALUING THE PASTURE RESOURCE - IMPORTANCE OF PERENNIALS IN HIGHER RAINFALL REGIONS OF SOUTH EASTERN AUSTRALIA

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Abstract

The premature decline of perennial grass based pastures in southern temperate Australia results in poor productivity and unstable pastures that allow invasion by less desirable weedy species and the potential for soil degradation. The loss of perennial species is attributed to overgrazing arising from an undervaluation of the pasture resource. Resowing pastures is largely uneconomic so maintenance of, or increasing the perennial, is dependent on improved grazing and pasture management practices. A key to changing perceptions is valuing the true worth of the perennial component. Results are presented from a model that takes into account the seasonality of production of pastures of different composition. The model uses specific metabolically energy values for the different functional groups that are typically within pastures (perennial grasses, annual grasses, legumes, broadleaf species) and livestock demand, to estimate animal performance and then gross margins for different pasture types. The results show that the value of perennial grasses is much greater than any other component and the more perennial grass, the greater the returns. The potential use of this approach to provide more useful information to landholders, permitting more appropriate management decisions to be made, is described.

Keywords: Grazing management, stocking rates, perennial grasses, functional groups, economic returns, gross margins

Introduction

The decline of perennial grasses in pastures in southern temperate Australia is a major concern (Kemp and Dowling, 1991; Hutchinson and King, 1999). Desirable perennial grasses comprise the functional group that ensures a more even supply of quality forage over a greater part of the year and provides stability to a pasture by pre-empting space and resources. Perennial grasses also have a major role in managing the water balance in soils, limiting salinity and acidity problems and reducing erosion. In past years, landholders were primarily interested in achieving the maximum weight of saleable animal product, which often resulted in overgrazing and a deleterious impact on the pasture (Freudenberger *et al.* 1999). Any decline in desirable species that occurred was remedied by periodically resowing the pasture. However, current re-establishment costs are often prohibitively expensive, and can only be considered in the more fertile and higher rainfall environments. The management attitudes of farmers to their pastures may in part arise from the way they have valued that resource. In this paper we demonstrate that if the components within a pasture are valued more appropriately then the true value of perennial grasses becomes apparent.

Material and Methods

Many perennial pastures in southern Australia contain at least four primary functional groups (perennial and annual grasses, legumes and broadleaf species – the latter are often weeds *e.g*. thistles). The value of the pasture depends upon the relative proportions of these functional groups. Each group produces different amounts of forage through the year that vary in forage quality. The model used here takes into account the effects of varying proportions of functional groups on the supply of metabolically energy to estimate the impact on animal production. The annual value of different pasture states can then be more reliably assessed than the traditional gross margin approach using annual data. The model takes no account of the cost of achieving the present state, nor attempts to attribute any future value – merely a snapshot of the annual forage system at a specified time. Energy values have been derived from the literature for species typical of those found in these pastures (Kemp and Dowling, 1991). Carryover of lesser quality feed at certain times of the year is assumed, and the stocking rate (SR) is constrained by the minimum available feed energy during the year. Set stocking is assumed.

Results and Discussion

A range of pasture states were set up using the model; from nil to 80% perennial grass with varying proportions of other functional groups in line with local experience (Table 1). The results illustrate that a pasture dominated by annual grasses and broadleaf species has a very low, negative, economic potential. However, an increasing proportion of perennial grass has a dramatic impact upon economic returns from the pasture resource. The impact of a 10% change in perennial grasses on profitability was much greater than from a similar change in any other component. The differences demonstrated here place a much greater value on the perennial grass components of a pasture than is commonly appreciated.

An intriguing outcome from this model was that changing the legume content, when all other components remained constant, had little impact on profitability. The model did not take into account the benefits of nitrogen fixation by the legume. It merely reflects the small direct impact legumes have on the quality of the forage supply. The big advantage of perennial grasses was in supplying some quality forage in drier seasons such as summer when other species were not growing.

The model used here did not consider sustainability issues such as soil acidity, minimising erosion or controlling rising salinity levels. All these problems would be minimised by perennial grasses relative to other pasture states. The additional benefits of perennial grasses for the control of these problems would further enhance the trends in Table 1.

Often pastures are in a degraded state with a low perennial grass content (Kemp and Dowling 1991). These pastures are generating such low incomes that reducing the stocking rate would be unlikely to improve returns unless it was done in a way that resulted in an increase in the perennial grass content. Strategies to do that are being developed (Dowling *et al*., 1996; Kemp *et al*., 2000) and they can be more cost-effective than resowing a pasture.

In the past many pastures have been treated like crops. However, the returns from livestock production have caused a shift in attitudes among many producers in Australia to trying to better manage and utilise their pasture resource. They cannot afford to resow pastures as was done in years past. Concepts of sustainable resource use have been developed and widely used in economic frameworks for pastoral or rangeland systems (Torrell *et al.* 1991; Wang 1993; Wang and Hacker 1997) but, such concepts have had limited application in the temperate perennial pasture systems of eastern Australia. They need to become a mainstream focus for livestock systems in the higher rainfall zones.

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Table 1 - Predicted economic returns (gross margins - $/ha/yr) from various combinations of pasture composition

Pasture composition				
Perennial grass (%)	Legumes (%)	Annual grass (%)	Broadleaf species (%)	Gross margin ($/ha/yr)
0	0	20	80	-8.42
0	20	40	40	-7.32
10	0	10	80	28.46
10	20	40	30	29.72
20	0	20	60	65.66
20	20	20	40	66.43
40	0	20	40	139.74
40	20	20	20	140.48
60	0	20	20	213.82
60	20	20	0	214.59
80	0	0	20	230.79
80	20	0	0	263.04