WOOL PRODUCTION FROM ANNUAL PASTURES INTENSIVELY GRAZED BY WETHERS IN SOUTHERN WESTERN AUSTRALIA

M.W. Hyder[1], A.N. Thompson[2], P.T Doyle[3], M. Grimm[1], P.J. Michael[4]

[1] Agriculture Western Australia, Albany Highway, Albany 6330, Western Australia

[2] Agriculture Western Australia, Katanning 6317, Western Australia

[3] Agriculture Victoria, Kyabram Dairy Centre, Kyabram 3620, Victoria, Australia

[4] Agriculture Western Australia, Baron-Hay Court, Perth 6151, Western Australia

ABSTRACT

Intensively grazing annual pastures in southern Western Australia to target amounts of feed on offer increased the greasy wool production per hectare three-fold or more compared to production from a set-stocked grazing regime. Feed on offer was maintained at 0.8, 1.1, 1.4, 2.0, 2.8 t DM/ha during spring and wool growth per hectare compared to that of sheep set-stocked at the district average of 8 sheep/ha. The role of intensive grazing as a tactic to increase production and profitability of wool producers in Mediterranean environments is discussed.

KEYWORDS

Feed on offer, intensive grazing, sheep, wool production

INTRODUCTION

In Mediterranean environments of Australia, conservative set-stocking rates and high pasture growth rates during spring lead to amounts of feed on offer (FOO) that are in excess of that required for maximum wool growth (Purser 1981). This unutilised pasture declines rapidly after senescence but losses due to grazing account for only a small percentage of the total loss of dry matter, the majority of the loss being due to respiration and natural decay (Doyle *et al.*, 1996).

Intensively grazing select paddocks on a farm during spring results in increased grazing pressure on some areas and destocking of other areas. The pasture from the ungrazed areas can be conserved as silage or hay and used to supplement animals grazing poor quality dry residues during summer and autumn. The nett result is that overall stocking rates may be increased, thereby increasing the wool production per hectare (Morley, 1981) and increasing the profitability of farms reliant on income from wool.

Hyder *et al.* (1996) showed little increase in wool production per head for sheep grazing pastures maintained during spring at amounts of FOO between 2 to 5 t DM ha^{-1}. This paper reports on the relationship between wool production per hectare and pastures intensively grazed to defined amounts of FOO during spring.

METHODS

The experiment was conducted at Mt Barker (34°38'S, 117°32'E) in southern Western Australia where the climate is typically Mediterranean, with the majority of the 640 mm average annual rainfall occurring in winter and spring. The pastures comprised about 50% subterranean clover (*Trifolium subterraneum* L., cv. Esperance and cv. Trikkala), 45% annual grasses (*Lolium rigidum* Gaudin, *Hordeum leporinum* Link, *Vulpia* spp., *Bromus* spp., *Poa annua* L.) and capeweed (*Arctotheca calendula* L. (Levyns).

There were 6 grazing treatments: 5 where grazing was "controlled" by the regular adjustment of non-experimental sheep numbers to achieve target FOO amounts of 0.8, 1.1, 1.4, 2.0 and 2.8 t DM ha^{-1} throughout spring. The sixth treatment was set-stocking at the district average (8 sheep/ha). There were 2 reps per grazing treatment, and the controlled grazing plots were 0.5 ha and set-stocked plots 1.0 ha.

The experiment commenced on 5 August (day 0) and ceased on 19 November (day 106) when pasture growth rates on the lowest grazing treatment could not maintain FOO at the target when stocked with core sheep alone. Feed on offer (FOO) was assessed weekly using a calibrated visual technique described by Thompson *et al.* (1994).

The experimental "core" sheep were 1 year old fine wool Peppin Merino wethers (liveweight 30.8 ± 0.27 kg, mean fibre diameter 20.7 ± 0.10 μm) which were stratified on a liveweight and fibre diameter basis before being randomly allocated to grazing treatments at 8 sheep/plot. During the experimental period, these core sheep received fortnightly dyebands alternatingly applied to 2 sites in the midside region. At shearing, the total weight of greasy wool (fleece, belly and locks) was recorded for the core animals.

Total wool grown per ha during the experimental period was calculated from the wool growth rate for each dyeband period, the number of grazing days in that period and the area of the plot. It was assumed that the wool growth rate for non-experimental sheep used to control FOO was the same as the average for core sheep in a plot.

RESULTS AND DISCUSSION

Figure 1 shows the FOO profile for the grazing treatments during the experimental period. Target amounts of FOO were achieved for the controlled grazed treatments while for the set-stocked treatment, the FOO increased from an average 3.4 t DM ha^{-1} from August to mid-October, to 8.6 t DM ha^{-1} for the latter part of the experiment.

Table 1 shows the effect of FOO on greasy wool production per hectare. Greasy wool production per hectare decreased linearly ($P<0.001$) with increasing FOO, the relationship being described by the equation:

Greasy wool production (kg/ha) = -18.6 (± 1.85) FOO + 112.7 (± 4.50) ($n=12$, $P<0.001$, $R^2=0.90$)

The results indicate grazing to target amounts of FOO during spring is achievable, and can result in large gains in wool production per hectare. However, the practicalities of intensive spring grazing, such as optimum paddock size, and how it fits into a Mediterranean farming system, need to be determined if farmers are to adopt this tactic as a means of coping with unpredictable and erratic climatic and economic environments.

Adoption of controlled grazing systems has been slower in Australia compared to New Zealand (Vizard, 1994), but added benefits of intensive spring grazing, including a decrease in the number of pasture pests such as red legged earthmite (Grimm *et al.*, 1994) or control of grass seed-set prior to cropping (Young, 1994) may assist in the adoption of this tactic.

ACKNOWLEDGEMENTS

Support for this work from the Meat Research Corporation in Australia is greatly acknowledged.

REFERENCES

Doyle, P.T., D.J. Carter, E.J. Speijers, T.W. Plaisted, R.E. Hetherington and R.A. Love. 1996. Changes in the amount and nutritive characteristics of annual pastures from late spring to autumn on the south coast of Western Australia. Aust. J. Exp. Ag. **36**, 791-801.

Grimm, M., M.W. Hyder, P.T. Doyle and P.J. Michael. 1994. The effect of feed on offer in spring on pest populations and pasture production. Proc. Aust. Soc. Anim. Prod. **21**: 233-6.

Hyder, M.W., A.N.Thompson and P.T. Doyle. 1996. The effect of feed on offer during spring on liveweight change in broad and fine wool Merino wethers. Proc. Aust. Soc. Anim. Prod. **21**: 309-12.

Morley, F.H.W. 1981. Management of grazing systems. *In* "Grazing Animals", (Ed. F.H.W. Morley) pp. 379-400 (Elsevier: Amsterdam).

Thompson, A.N., P.T. Doyle and M. Grimm. 1994. Effects of stocking rate in spring on liveweight and wool production of sheep grazing annual pastures. Aust. J. Agric. Res. **45**: 367-89.

Purser, D.B. 1981. *In* "Grazing Animals", (Ed. F.H.W. Morley) pp. 159-80 (Elsevier: Amsterdam).

Vizard, A.L. and J.Z. Foot. 1994 . Animal and pasture maintenance, a partnership. *In* "Pasture management for the 21st Century", (Ed. D.R. Kemp and D.L. Michalk) pp. 100-13.

Young, J.M. 1994. Pasture management and productivity in practice: the annual pasture zone. *In* "Pasture management for the 21st Century", (Ed. D.R. Kemp and D.L. Michalk) pp. 117-124.

Table 1

Greasy wool production per hectare of Merino wethers grazing pastures maintained at different amounts of feed on offer or set-stocked during spring.

	Feed on offer (t DM ha^{-1})						
	0.8	1.1	1.4	2.0	2.8	set-stocked	s.e.d*
Greasy wool production (kg ha^{-1})	94.0	90.6	92.9	76.8	72.0	21.4	6.24

*Standard error of the difference

Figure 1

Feed on offer profile for annual pastures intensively grazed or set-stocked during spring