GRAZING WITH WETHERS TO REMOVE WHEAT STUBBLE PRIOR TO RECROPPlNG

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SUMMARY

A wheat stubble of 4.5 t DM/ha was grazed by Merino wethers (41 kg average liveweight). The wethers were stocked at either 50 or 100 per ha; with or without a daily supplement of pelleted, cottonseed meal. The aim was to substantially remove stubble DM prior to recropping with wheat. Regardless of stocking rate only 36 days grazing was possible without supplementation compared to 57 days with supplementation. Heavy stocking with supplementation reduced stubble DM to 1.6 t/ha (compared to 2.5 t/ha for the other treatments) and these plots subsequently grew the best wheat crop.

INTRODUCTION

Traditionally sheep-wheat farmers in southern Australia burn crop stubble prior to re-cropping. Although this is a quick and effective means of removing the stubble material, burning pollutes the environment and generally removes too much organic matter. Currently, there is considerable interest in retaining stubble (rather than burning) to benefit soil structure and moisture retention. But cropping into excessive stubble material is known to restrict the growth of the subsequent crop.

Farmers usually graze stubbles with sheep - often very heavily in an attempt to substantially reduce paddock DM prior to cropping. In fact heavy grazing with sheep is an integral preliminary of recommended, direct-drilling, techniques for cropping.

There has however been little attention paid as to how dry matter removal might be manipulated through stocking rate and strategic supplementation.

This project was conducted at Rutherglen Research Institute in 1982 and involved various grazing treatments of stubble followed by a study of how the yield of a subsequent wheat crop was affected by the amount of stubble present at seeding.

MATERIALS AND METHODS

A uniform area of wheat stubble (cv. Oxley) was subdivided into 15 plots each of 0.105 ha. A flock of 90, 18 month-old Merino wethers were stratified into five sets of 18 wethers according to liveweight (which averaged 41 kg). They were allocated to six groups of five and six groups of 10 wethers by assigning at random from each set, one wether to each of the small groups and two wethers to each of the large groups.

The experimental design was a randomized block with three replications of five grazing treatments. The grazing treatments were: control (no grazing); moderate stocking rate (5 wethers/plot); heavy stocking rate (10 wethers/plot); moderate stocking rate + supplement; heavy stocking'rate + supplement. The supplement was 200 g/head/d of pellets based on cottonseed meal (80% cottonseed meal, 11% soybean meal, 4% meat meal, 1% blood meal, 2.5% dry molasses, 1.5% minerals and vitamins).

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The wethers grazed the plots from the 24th February. They were removed in April when the average weight loss of treatment groups exceeded 300 g/d or condition score fell to 2.

All wethers were weighed weekly during the period of stubble grazing. Wool growth in the experiment was measured by dyebanding and the relative wool growth over 28 days was expressed as a proportion of the annual growth for each wether.

The amount of stubble DM on each plot was estimated weekly during the period of grazing by cutting ten quadrats per plot.

The whole plot area was sown again to Oxley wheat in May 1982, following the grazing treatments. The grain yields on the plots representing the past grazing treatments were measured at harvest in December, 1982.

RESULTS

The wheat stubble DM had 2.9% crude protein and an in vitro DM digestibility of 42%. Based on the deterioration in body condition and liveweight change, the unsupplemented wethers were removed from the plots after 36 days of grazing, whilst supplemented wethers were removed after 57 days. Liveweight loss was significantly greater for unsupplemented wethers compared to supplemented wethers. Similarly, wool growth was significantly less for unsupplemented wethers compared to supplemented wethers. Increasing stocking rate (SR) had no significant effect on liveweight change, but did marginally decrease wool growth (Table 1).

TABLE 1 Liveweight change and relative wool growth of wethers during the grazing of wheat stubble

Treatment	Liveweight change (g/d)	Relative wool growth (%)
Moderate SR	-157	4.00
Heavy SR	-194	3.40
Moderate SR + supplement	14	6.47
Heavy SR + supplement	-17	5.99
LSD P = 0.05	38	0.39

At the start of grazing, the average stubble DM over all the plots was 4.5 t/ha. Supplemented grazing removed significantly more stubble DM than did unsupplemented grazing at moderate SR (Table 2). Heavy SR with supplementation was most effective in removing stubble, reducing stubble DM to 1.60 t/ha at the end of grazing. There was a significant ($P<0.05$), curvilinear, relationship between stubble DM and the following crop yield (Figure 1); that is wheat grain was highest where there was least stubble and lowest where retained stubble was heaviest.

TABLE 2 Stubble DM that disappeared during the grazing period

Treatment	Stubble DM that disappeared during grazing period (t/ha)
Control (no grazing)	1.03
Moderate SR	1.40
Heavy SR	2.24
Moderate SR + supplement	2.65
Heavy SR + supplement	3.07
LSD (P = 0.05)	1.20

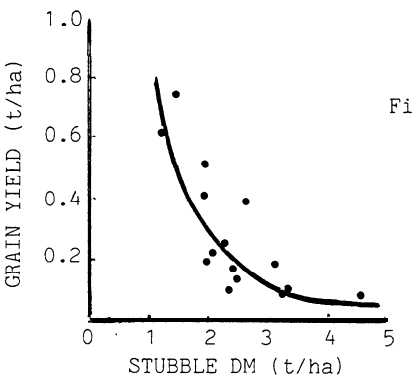

Fig. 1 Relationship between stubble DM (S) on plots after grazing and the grain yield (Y) of the following crop.

$$Y = \frac{0.489}{(S-0.6)} - 0.035 \quad (R=0.83)$$

DISCUSSION

In order to reduce stubble DM to a level where subsequent cropping was satisfactory, the grazing management of wethers required both heavy stocking on the stubble and supplementary feeding. It is of interest that about 1 t/ha of stubble DM disappeared over the grazing period from weathering and wind removal. The supplementary feeding with pelleted, cottonseed meal presumably benefited the wethers by supplying extra, readily digestible M.E. and also stimulating the wethers to eat the stubble. Supplements of bypass protein, such as cottonseed meal, characteristically stimulate appetite for poor quality roughage (Leng et al. 1977).

The poor wether performance in this experiment is consistent with observations of Mulholland and Coombe (1979) and Butler (1981) who found that grazing of wheat stubble resulted in liveweight loss and poor wool growth. Although it is a common pre-cropping practice to graze stubble very heavily with wethers, it is likely that such grazing management is detrimental to animal production and unlikely to decrease stubble DM to a desired level of about 1 t/ha. (A ground cover of about 1 t/ha is low enough so as not to restrict crop establishment or subsequent crop yield - T.G. Reeves, pers. comm.).

Unless sheep are induced to consume wheat stubble by heavy stocking and strategic supplementary feeding, they will not remove substantial quantities of

stubble. Mulholland et al. 1976 found that sheep removed less than 36% of cereal stubbles. Although in this experiment sheep were managed to remove over 50% of stubble, the logistics of such grazing on a broad scale would be unrealistic.

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