

Herb and clover mixes increase average daily gain (ADG) of finishing lambs in different seasons

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Introduction

Approximately half of the usable land area in New Zealand is under grasslands (Saggar 2001). Production of lamb meat is seasonal in New Zealand (Fisher 2004) with the majority of lambs born in the spring and slaughtered in late summer and autumn depending on the international demand (Clemens and Babcock 2004) and pasture growth pattern. Finishing lambs outside this window using high quality pastures would help to facilitate a continuous supply of meat to the domestic and international markets. Charlton and Belgrave (1992) and Kemp *et al.* (2010) reported that the use of herb-clover mixes instead of perennial ryegrass/white clover swards would facilitate finishing lambs to a high carcass weight or in a shorter time period. Therefore, a research was undertaken in four different seasons: early spring, late spring, summer and autumn during 2011/2012 with the hypothesis that the average daily gain (ADG) and average live weight per ha per day of finishing lambs would be greater in herb-clover mixes than on a perennial ryegrass/white clover sward.

Method

This study was carried out at the Moginie Pasture and Crop Research Unit, Massey University, New Zealand. The three herbage treatments were 'Pasture mix' (ryegrass *Lolium perenne* L. cv one50 and white clover *Trifolium repens* cv Bounty); 'Plantain mix' (plantain *Plantago lanceolata* cv Ceres Tonic, white clover and red clover *Trifolium pratense* cv Sensation); 'Chicory mix' (plantain, chicory *Cichorium intybus* L. cv Puna II, white clover and red clover). Each treatment had three groups (replicates) of lambs during each season. Lambs were stratified by live weight and allocated to one of the three treatments to ensure there

was no difference in live weights at the start of the study.

Each group of lambs was rotationally grazed within three paddocks. The size of each paddock was 0.25 ha. To ensure *ad libitum* herbage allowance lambs were moved into a new paddock when the minimum sward surface height reached 5 cm in the Pasture mix and 7 cm in the Plantain and Chicory mixes. Lambs were weighed within an hour of removal from the herbage. The aim was to graze each season for 60 days. However, when herbage growth did not meet animal demand the lambs were slaughtered. All lambs were slaughtered at Alliance Meat Works (Dannevirke, New Zealand) at the end of each season. Individual lamb data was analyzed using a linear model with herbage treatment and season and their interaction as a fixed effect and the group of lambs effect was nested within the herbage treatment x season interaction using proc GLM in SAS version 9.2 (SAS 2008).

Results and Discussion

Among the three herbage treatments Plantain mix had the greatest ADG ($P < 0.05$) compared to the Chicory mix which in turn had greater ($P < 0.05$) ADG compared to the Pasture mix (Table 1) showing that lambs in the herb-clover mixes grew at a faster rate than the Pasture mix. Similarly, Plantain mix lambs were heavier ($P < 0.05$) than the Chicory mix lambs which in turn heavier ($P < 0.05$) than the Pasture mix lambs (Table 2). Thus, by feeding the herb-clover mix of plantain and/or chicory, farmers could achieve the target slaughter weight within a shorter period of time allowing them to market lambs earlier or take lambs to heavier carcass weights during the early spring to autumn period.

Table 1. Effect of herbage treatment (Pasture mix vs Plantain mix vs Chicory mix) on average daily gain (ADG) (means \pm s.e).

Season	Average daily gain (g/day)		
	Pasture mix	Plantain mix	Chicory mix
Early spring	322 a \pm 11.2	336 ab \pm 11.2	360 b \pm 12.4
Late spring	193 a \pm 9.9	304 c \pm 9.8	262 b \pm 9.8
Summer	169 a \pm 13.6	226 b \pm 10.2	214 b \pm 10.3
Autumn	160 a \pm 12.5	295 c \pm 11.6	255 b \pm 11.6
Average	211 a \pm 10.0	290 c \pm 5.4	273 b \pm 5.5

Differing superscripts within rows indicate means differ significantly ($P < 0.05$)

ADG = (start body weight - end body weight)/number of days reared

The means were separated using LSD procedure in proc GLM in SAS version 9.2 (SAS 2008).

Table 2. Effect of herbage treatment (Pasture mix vs Plantain mix vs Chicory mix) on average live weight per ha per day (means \pm s.e).

Season	Average live weight (kg) per ha per day			No of grazing days
	Pasture mix	Plantain mix	Chicory mix	
Early spring	9.7 \pm 0.35	10.1 \pm 0.35	9.0 \pm 0.38	28
Late spring	7.7 a \pm 0.31	12.2 c \pm 0.30	10.5 b \pm 0.30	47
Summer	4.1 a \pm 0.42	9.0 b \pm 0.32	8.5 b \pm 0.32	49
Autumn	4.5 a \pm 0.39	9.4 c \pm 0.36	8.2 b \pm 0.36	35
Average	6.5 a \pm 0.18	10.2 c \pm 0.16	9.0 b \pm 0.17	

Differing superscripts within rows indicate means differ significantly ($P < 0.05$)

Average live weight (kg) per ha per day = (stocking rate \times ADG)/1000

The means were separated using LSD procedure in proc GLM in SAS version 9.2 (SAS 2008).

These data provide support for the hypothesis that finishing lambs with herb-clover mixes will out-perform lambs that are grazed on perennial ryegrass and white clover pastures over the early spring to autumn seasons and support the findings of Golding *et al.* (2011).

Conclusion

Herb-clover mixes comprised of plantain, chicory, white clover and red clover produce heavier lambs and finish lambs at a faster growth rate during spring to autumn period in the Manawatu region, Palmerston North, New Zealand.

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