

More lucerne reduces feeding in drought years and increases the weight of lamb sold in wet summers

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Abstract: *This study examined whether increasing the proportion of farm area sown to lucerne, rather than perennial grass pastures, from 20 to 40% would increase production and gross margins. A replicated experiment was conducted between 2006 and 2010 in south-eastern NSW using September-lambing Merino ewes producing Merino and crossbred lambs. The higher level of lucerne did not increase wool or lamb production in most years, but reduced supplementary feeding in drought years. In a year with high summer rainfall, a larger area of lucerne increased ($P < 0.05$) lamb sold by 168 kg/ha. Gross margins were relatively similar in drought years, but in a wet summer more lucerne increased gross margins by 87%. This study suggests that 40% rather than 20% lucerne does not have an adverse effect on production in drought years, and that in years with high rainfall over summer the additional lucerne can be used to achieve a large increase in production of sheep enterprises that are capable of utilising the additional feed.*

Key words: farming system, sheep

Introduction

Lucerne (*Medicago sativa*) which grows at times when other pastures fail to persist and leave a feed gap have the potential to increase farm profits (Young *et al.* 2010). Extension of the supply of quality feed can reduce the need for supplementary feeding, allow lambs to be retained for longer and be sold at heavier weights and may allow an increase in stocking rates (Byrne *et al.* 2010). For annual pasture based farming systems in the mixed livestock/cropping zones, the optimum proportion of the farm sown to lucerne has been estimated at 10 and 25% for wool/meat and meat-based sheep systems, respectively, in Western Australia, and 25 to 30% for the central west slopes of eastern Australia (Byrne *et al.* 2010). However, there was a considerable range in lucerne area which generated similar profits and the optimum differed between locations.

In the higher rainfall grazing zone, perennial grasses often form the pasture base. The longer growing season of perennial grasses compared with annual pastures means that incorporation of lucerne at more than 30% of farm area may provide little benefit to production. This study

was conducted to evaluate whether 40% rather than 20% of farm area as lucerne could increase production and gross margins for a spring lambing flock.

Methods

Design and management

The experiment was conducted near Tarcutta, NSW (35°12'S, 147°31'E) from 2006 to 2010. A randomised block design was used with three replicates of two treatments. Each replicate of each treatment comprised three paddocks – one each of lucerne (cv. Aurora), phalaris (*Phalaris aquatica*, cv. Australian) and tall fescue (*Festuca arundinacea*, cv. Resolute and Quantum) totalling 5.2 ha per farmlet. All pastures contained a subterranean clover (*Trifolium subterraneum*) base. By area, the 20% lucerne treatment was 20% lucerne, 20% fescue and 60% phalaris, while the 40% lucerne was 40% lucerne, 15% fescue and 45% phalaris.

Both treatments used the same sheep enterprise – fine/medium Merino ewes with 50% joined to Merino and 50% joined to terminal (Composite – based on Poll Dorset, 2006 to 2009; Poll Dorset in 2010) rams lambing from the first week in September. The same stocking rate was used in

both treatments in each year – 7.8, 7.8, 9.8, 8.5 and 8.5 ewes/ha in 2006 to 2010, respectively. Lambs were sold either at weaning in early December or retained while pasture conditions allowed. Ewes were supplementary fed when required, and managed to achieve a body condition score of 3 at joining and lambing.

Wool and lamb production was recorded. Gross margins were calculated using an annualised (lucerne seven years, phalaris ten years) pasture establishment and maintenance cost of \$72 for 20% lucerne and \$76/ha for 40% lucerne treatments. An additional fertiliser cost of \$4/dry stock equivalent/ha/year (range \$146 to \$186/ha) was included. Feed costs of \$300/t for grain and \$100/t for straw were used. Carcase values were 360 c/kg for Merino lamb, 450 c/kg for crossbred lamb and 250 c/kg for ewes. Wool values were calculated using Woolcheque (www.wool.com) (November 2010 to November 2011), with an indicative value of 1411 c/kg clean for 20 micron wool. The initial purchase cost of ewes was not included.

Clean wool and lamb production per hectare were analysed using Genstat (Payne *et al.* 2009) by analysis of variance using year and treatment as fixed effects and replicate as the random effect. Supplementary feeding and gross margins were calculated from treatment averages so were not statistically analysed.

Results and discussion

Annual rainfall (252, 477, 536, 604 and 1185mm, 2006 to 2010, respectively) was low in 2006 to

2008, with all years 2006 to 2009 characterised by a failure of spring rainfall. High levels of rain occurred in 2010.

The treatment with 40% lucerne did not ($P > 0.05$) produce more lamb per hectare than that with 20% lucerne in drought years (2006 to 2009), but produced 168 kg/ha more ($P < 0.05$) lamb in 2010 (Table 1) due to lambs being retained for longer. A higher proportion of lucerne did not ($P > 0.05$) increase fibre diameter, or the quantity of clean wool produced, although wool production was reduced in 2007 (21 compared with 27 kg/ha) due to a higher proportion of ewes failing to become pregnant in the 20% treatment in that year.

High levels of supplementary feeding were required by ewes in 2006 to 2009 (Table 1), but on average the 40% lucerne treatment required 72 kg/ha less (range 0 to 198) supplement. The high cost of supplementary feeding meant low gross margins in both treatments in 2006 to 2009. However, in 2010 40% lucerne produced higher gross margins due to the higher quantity of lamb sold. The initial purchase cost of sheep and annual interest charges are not included in gross margins but should also be considered.

Conclusions

This study suggests that during drought years there is no sheep production disadvantage of incorporating 40% rather than 20% lucerne in a grazing only sheep system in this environment. There can be a large benefit in years favourable to lucerne growth over summer, if the additional pasture is utilised.

Table 1. Production and gross margins for sheep systems with 20 or 40% lucerne.

Treatment	2006	2007	2008	2009	2010	I.s.d. (P = 0.05)
Live weight of lambs sold(kg/ha)						
20% lucerne	168	144	165	198	197	(Trt x year)
40% lucerne	170	157	168	211	365	40
Supplement fed (kg/ha)						
20% lucerne	1517	742	1317	1125	274	
40% lucerne	1429	686	1118	1106	274	
Gross margin (\$/ha)						
20% lucerne	28	88	24	108	303	
40% lucerne	23	118	37	145	567	

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