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SHEEPPRODUCTION ON DRYLAND LUCERNE

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Abstract

On dryland at Winchmore Irrigation Research Station In Mid Canterbury high levels of lamb production were obtained during 12 years in a self-contained lucerne/supplementary forage farmlet.

The system established lucerne under a barley crop and used turnips with Italian ryegrass and Tama ryegrass in the lucerne renewal rotation. Lucerne hay and barley grain and straw were conserved for supplementary feed.

Stocked at 15 ewes/ha, lamb meat production varied from 210-300 kg/ha between years. This variation reflected the effect of dry summer conditions on both lucerne growth and the establishment of the supplementary crops which in turn influenced ewe prolificacy and lamb growth.

Because of yield variability and increasing costs, use of annual forage crops in a dryland sheep unit is questioned.

Keywords: grazing, management, forage crops, lamb production.

INTRODUCTION

In the 1960s and 70s there was considerable interest in grazing lucerne on light unirrigated soils. Stewart and Taylor (1965) discussed a system entailing annual renewal of one eighth of the area with turnips and ryegrass and some overdrilling of lucerne with Tama ryegrass. Vartha and Fraser (1978) reported on a lucerne system where winter feed was provided from 17% of the area sown with Tama ryegrass and a further 34% overdrilled with Tama. Both these systems flushed and mated ewes on lucerne but Scales *et al.* (1977) demonstrated that twinning is substantially reduced by lucerne grazing over this time.

Janson (1975) described three areas of management which help overcome the *slow lucerne* growth *in* early *spring.* These are the transfer of production through to early spring by forgoing autumn and winter grazing, the higher spring yields obtained by delaying spring grazing, and the need for rotational grazing during the pre-weaning period. Janson and Knight (1973) concluded that lucerne could be established under a cereal grain crop.

The farmlet described in this paper attempted to integrate these research results with the animal requirements in a high producing dryland system.

THE FARMLET

A 5.5 ha area of Wairau lucerne was sub-divided into 15 paddocks and stocked with Corriedale ewes in August 1973. The unit continued until autumn 1985. The initial stocking rate was 13.5 ewes/ha but in December 1974 it was increased to 15/ha. The ewe breed was changed to Border-Carriedale in February 1976. Ewes were mated to Suffolk rams.

Crop rotation

Lucerne was maintained for 5-6 years and then replaced following a 2 year cropping rotation: rape or turnips (sown in December) → Tama ryegrass (late April)- turnips and Manawa ryegrass (December) → lucerne and barley grain crop (late September). This gave a spring grazing of 74% lucerne and 13% Tama ryegrass. The remaining 13%, regrowth following the winter crop, was available for grazing until mid September.

The Tama paddocks were not grazed during the winter and received 50 units of nitrogen in late July to build up a substantial bank of lambing feed. 250 kg/ha of superphosphate was applied annually to the lucerne and drilled with each crop establishment.

Wairau lucerne was sown until 1979 when concern over disease and pests prompted a change to WL318 or Rere for the next four years. But concurrent cultivar research (Janson & Knight 1985) demonstrated that Wairau was equal to any other cultivar under dryland grazing and it was sown again in the final year. Grasslands Oranga was not then available.

Management

The rape or turnips, the first crop in the renewal rotation, supplemented with barley grain was utilised at flushing and mating. The ewes then grazed all lucerne paddocks for one rotation thus setting up the spring grazing rotation. The paddocks grazed first followed the autumn/winter spelling system advocated by Janson (1975). Turnip and grass crops were grazed from mid June to the start of lambing in late August. Lambing was set at this time to allow the lambs to be grown during the spring and early summer when the growth rate of dryland lucerne is highest. Tama ryegrass paddocks were grazed over lambing, thus keeping stock off the lucerne until mid September and allowing a buildup of lucerne herbage. The ensuing lucerne rotation was slowed by returning to graze any grass regrowth. Following weaning at 6-8 weeks of age, lambs leader-grazed the lucerne with the ewes following. Early weaning, as suggested by Jagusch et *al.* (1970), allowed lambs to directly utilise the highly palatable and nutritious lucerne leaf. The success of this is demonstrated by an average lamb growth rate from weaning to drafting of 240 g/head/day. Hay and straw supplemented the ewes whenever required.

Janson (1978) concluded that lucerne grazing duration could be extended up to 15 days but that long spelling between defoliations is the most important factor. Mean grazing duration during the growing season on this farmlet was 8-10 days and extended to 16 days during winter. Spelling duration was up to 140 days before the first spring grazing, dropping to a low of 42 days in January. This management maintained high lucerne production.

Lambs were drafted prime for export on 3-6 occasions from late November to mid February aiming at a maximum carcase weight of 16 kg in the appropriate P and Y grades. This target weight was lowered if dry conditions slowed lucerne growth.

Cull ewes were sold after lambing and in early February and an average of 18% replacement two-tooth ewes were purchased in late February.

Only four paddocks were sprayed for weed control and two for blue-green aphid control over the eleven years of the trial but after 1981 sitona weevil was controlled each autumn in the newly established lucerne.

PRODUCTION

Animal production and grain and hay production and use were recorded but there was no measurement of herbage production.

Meat and Wool

High levels of lamb meat were produced (210-300 kg/ha). This compares well with production over the same years of 257-386 kg/ha from a high producing irrigated farmlet study (Moss 1985). Table 1 demonstrates that in most years when the number of lambs sold was down, compensating gains in carcase weight were obtained. In 1975 with a poor lambing of 92% an extra 9.6 lambs/ha were purchased and grown. This increased the meat production to 233 kglha but gave a low monetary return and was not repeated.

Table 1: Farmlet production.

	lambs sold/ ewes mated %	Lamb meat kg/ha	Mean Lamb carcase wt kg	Wool kg/ha
1974175	100	213	15.2	65
1975176	92	233	14.3	66
1976/77	110	234	14.1	70
1977/78	115	230	13.3	53
1978179	108	235	14.3	56
1979180	106	240	15.0	54
1980161	144	304	13.9	63
1961162	99	224	15.0	58
1962183	102	211	13.7	54
1983/84	100	233	15.4	49
1984/85	122	255	13.9	65
Mean	109	237	14.4	59

In the final two years of this study, which were closely related to today's market requirements, 76 and 94% of the lambs were in the medium and heavy weight grades. This indicates that a lucerne grazing system is capable of producing heavy weight lambs.

Wool production (Table 1) from the ewe flock fluctuated with changes in feed supply and stock condition.

Hay and Grain

Because of the fluctuations in rainfall and therefore in herbage production experienced in Mid-Canterbury, substantial hay and grain reserves need to be carried from year to year.

Establishing lucerne under a barley crop was generally successful with grain yields of between 1.4 and 5.3 t/ha. In 1977 two tonnes of surplus grain was sold.

Lucerne hay paddocks were closed after the first grazing with the area closed depending on both current feed supply and level of reserves carried over from previous years. In 1974/75, with very good growing conditions and the lower stocking rate, substantial hay reserves were built up and this influenced hay making decisions for a number of years. In the winter of 1982, when hay reserves were low, 0.5 bales of straw/ewe was purchased. Table 2 demonstrates that all hay and straw conserved was used but that a grain reserve was maintained.

Table 2: The production and use of conserved feeds (1974.84).

	Mean	Min.	Max.
Barley grain harvested (kg/ewe)	21.9	12.4	45.7
Barley grain fed (kg/ewe)	15.9	0	28.0
Lucerne hay baled (bales/ewe)	1.1	0.3	4.2
Lucerne hay fed (bales/ewe)	1.0	0	2.3
Barley straw baled (bales/ewe)	0.5	0.1	0.7
Barley straw fed (bales/ewe)	0.5	0.1	0.7

Forage Crops

Tama ryegrass establishment was successful in all years and produced reliable lambing feed. When conditions were favourable, turnips also produced high yields. But in 2 years they failed, in 3 years they gave poor yields for ewe flushing and in 1 year had reduced yields in winter. In the years when the turnips failed, a cereal forage was drilled in autumn for winter feed.

CONCLUSIONS

This dryland system sustained a high stocking rate and gave excellent lamb growth over a period when disease and pest problems reduced farmer confidence in

lucerne. These did not prove to be a major concern in this study.

Good production levels were maintained with only a small amount of brought-in feed in one year and this may have been avoided by feeding barley grain in the winter of that year.

However, this system relied on supplementary forage crops established in mid-summer. Because of the wide yield range of these crops and the increasing costs of annual feed establishment, this system can no longer be advocated.

A system currently under investigation at Winchmore has a balance of permanent ryegrass and Matua prairie grass to provide winter/spring and flushing feed and lucerne to give the high lamb growth rates required for heavy weight carcase production. Finding the correct proportion for each crop will be an important factor in this study and if the persistence of these three forages can be extended, renewal costs, one of the large costs in the lucerne/supplementary crop system, will be reduced.

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References

Jagusch K.T., Clarke V.R., Jay N.P. 1970. Lamb production from animals weaned at 3 to 5 weeks of age Onto *lucerne. NZ Journal of Agricultural Research 13:* 808-814.

Janson C.G. 1975. Lucerne management for the critical spring period under light land grazing. Proceedings NZ *Grass/and* Association 36 *(1):* 66-72.

Janson C.G. 1976. Studies on duration of grazing and defoliation in lucerne. Ph.D. Thesis. Massey University.

Janson C.G., Knight T.L. 1973. Establishment of lucerne with cover crops under different soil moisture conditions. *NZ Journal of Experimental Agriculture 1:* 243-251.

Janson C.G., Knight T.L. 1985. Aphid resistant lucerne cultivars in Mid-Canterbury. Proceedings NZ Grassland *Association 46: 227.230.*

Moss R.A. 1965. Intensive sheep production under irrigation. *Winchmore irrigation Research Station Technical Report 19.*

Scales G.H., Moss R.A., Kelly R.W. 1977. Reproductive performance of ewes mated on lucerne. *Proceedings NZ Society of Animal Production 37:* 152-157.

Stewart J.D., Taylor N.W. *1965. Management* considerations in farming *lucerne on* low-rainfall light land. *Proceedings Lincoln College Farmers Conference 15: 93-99.*

Vartha E.W., Fraser T.J. 1976. Lucerne-Tama ryegrass systems for fat lamb production. *NZ Journal of Experimental Agriculture 6:* 195-200.