A PASTURE/FORAGE SYSTEM FOR PRIME LAMB PRODUCTION

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The property is located on the central western slopes of N.S.W. Annual rainfall is 630 mm evenly distributed throughout the year, although it is highly variable in the summer. The property comprises 135 ha of sandy loam to alluvial flats, subdivided into approximately 12 ha paddocks with trough watering. Our history has been a prime lamb/mixed farming operation. However, the size of the machinery required for cropping wasn't justified given the size of the property. As well the high input costs and the low commodity prices have seen us move out of cropping. We are now concentrating on developing a pasture based feeding system for prime lamb production. This system allows diversification of income from sources such as lucerne seed production and excess grain and hay production.

First cross Border Leicester x Merino (approximately 600) ewes are joined to Dorset rams in mid to late October for about 8 weeks. Shearing is in early October to minimise flystrike risk. Ewes are pregnancy tested in February and dry ewes are removed to be rejoined in April. This enables better management of nutrition of ewes in late pregnancy. The dry ewes are joined in April/May and pregnancy tested in July. Dry ewes at this stage are sold.

Winter active lucerne varieties are sown in autumn into a paddock previously sown to oats. The use of oats provides grazing fodder and grain and enables chemical control of broadleaf weeds (e.g., Paterson's curse, capeweed and thistles) prior to the reintroduction of lucerne. Approximately 35 ha of oats is sown each year depending on paddock availability and the time of the autumn break. The later the break the more oats needs to be sown. Naturally occurring annual ryegrass is the other major pasture species.

On my property I am endeavouring to run a lamb factory to turn off the maximum number of lambs from the available pasture. Seasonal fluctuations in pasture production and stock requirements generally do not correspond. The most critical periods are from late summer to early winter when ewes lamb and pasture growth is lowest.

In dealing with any feeding system it is necessary to understand the nature of the beast one is feeding. My objective is to control ewe fodder intake during periods of high pasture availability. This prolongs the period of grazing and reduces the requirement for expensive grain and hay feeding. This idea has come from the notion that a good stand of grazing oats can provide a maintenance ration from a limited grazing time per day. This suggests that it may be possible to design a system that will maximise the return from one's pasture.

There are two ways that this may be done:-

1) Rotational grazing using a set number of stock which would suit an irrigation system; and

2) Controlled grazing using set periods of grazing, which can be used under a dryland situation.

Both will require additional subdivision fencing.

We conducted a rough experiment to see whether the second option was feasible; 200 dry ewes, in forward store condition, were grazed for 5h/day on a 16ha paddock comprising a lucerne/ryegrass mixture. An area of approximately 0.25ha was fenced off with adequate shade and water and the sheep were yarded there for the remaining 19h. Past experience suggested that the paddock would last the mob about 3 weeks. It lasted just on 6 weeks with no apparent visual deterioration in the condition of the sheep. However in a prime lamb situation there are peak requirements of fodder and these more often than not will be supplied by grain and hay.

In a twelve month cycle of production a number of periods can be recognised:

(i) 7 to 8 months during which the ewe can be run as a wether, (1DSE);

(ii) one month pre-lambing when food intake increases to become 1.5 DSE;

(iii) 3 to 4 months when the ewe is rearing the lamb - equivalent to 2.5 to 3 DSE. Any shortage in this last stage can cause twin-shedding.

In the Cowra district, most lambs are produced in the autumn/winter period when pasture growth is least. Needed feed is provided by grazing oats. It is interesting to note, however, that the majority of producers I have surveyed suggest that the amount of oats sown is dictated by the paddock size available, rather than the food requirements of the mob. Further feed deficits would be covered by feeding grain and other concentrates.

In our case stock are always removed from oats and pastures at night during frosty weather and not allowed back on until the frost has lifted the next day. The mob has access to bunstack hay in the yards overnight. This is the cheapest form of hay, and as shedded hay is said to lose 8% of its nutritive value per annum, the outside thatch loss of bunstacks or round bales is a small price to pay for the ease of supply.

Research by the NSW Department of Agriculture suggests that whilst the fecundity of the ewe is affected by daylength her twinning ability is directly affected by her body weight up to six months prior to joining.

From a case study of a mob of 1st X ewes last year the following points arise:

199 ewes pregnancy tested as in lamb out of 366 (54% conception);
25 lambs observed in the first 12 births (and the rate appeared to continue);
102% lambs marked (our neighbour shot 27 foxes during our lambing period).

These lambs were sold from 17 to 20 weeks of age over a twelve week period. The first 95 averaged $37.22 net, whilst the balance netted $28.57.

To shorten lambing and get rid of lambs earlier, we wean lambs at 13 weeks onto good oats with hay and grain in a feeder. This is started whilst lambs are still on their mothers. Lambs have no lack of bloom and less excess fat. During this study there were 45 frosts with temperatures to -6°C. This raises the question: How much moisture is lost for every one

degree of frost and what effect will it have on the subsequent grain production? We used Echidna grain oats last year as well as shutting up the grazing oats. Given the result of the Echidna, we can now sow one third the area for the same grain yield, and will possibly get a further two months grazing from our Cooba. We of course have to save enough for grazing oat seed for the following year.

Lupins and clover hay are also purchased and are an invaluable source of energy and protein giving flexibility in management at critical times.

Our only introduced pasture species is lucerne and with the introduction of winter active varieties our management opportunities have been greatly expanded. In 1987 a first year lucerne stand yielded 2 t/ha of hay whilst the grazing oats supplied 1.25 t/ha and the grain oats 2.5 t/ha. As we feed rations in the ratio of 60% grain to 40% hay, these yields would have supplied 100 sheep with the following rations:

Yield	Lucerne Hay (2 t/ha)	Grazing oats Grain 1.25 t/ha	Grain oats Grain 2.5 t/ha
100 dry sheep	83 days	34 days	64 days
100 wet sheep	27 days	11 days	22 days

A unit of measure by which comparisons can be made between various fodders is termed a "grazing unit" (G.U.). It is arrived at by multiplying the numbers of days the paddock has been grazed by the average number of stock and dividing the answer by the hectares in the paddock, i.e.:

$$1 \text{ Grazing Unit} = \frac{\text{days grazed x average stock numbers}}{\text{hectares}}$$

Work done by Tucker and Simpson (1969) showed that to obtain a maximum yield, oats could either be grazed or shut up for grain but not both. Some observations I have made would suggest that the same is true for lucerne. The paddock will yield its maximum potential when either cut for hay, or grazed, but not both; this is assuming that it is an average season. The following is an example of grazing units obtained from lucerne pastures of varying age and oat fodder crops, together with other production obtained over the same nine months if the crops were used for dual purposes.

		G.U. per Month	Other Production
Lucerne:	3 yr old	324	Nil
	2 yr old	196	2 t/ha Hay
	1 yr old	23	2 t/ha Hay
	1 yr old	145	Nil
Oats:	Graze	238	Nil
	Graze/Grain	212	1.25 t/ha

The 3 year old lucerne result was inflated by a crash grazing program on a portion of the paddock requiring re-establishment but is still worth recording as it was an actual management decision. Wheat was sown on this area and yielded as follows:

Stock No	459 DSE	**Days**	38
Area	6.5 ha	**S.R.**	70/ha
G.U.	2688		

The sheep had no other feed and were weighed at the beginning, three weeks later and finally a further two months later. The average weights were 66, 62 and 56kg/head at the first, second and third weighings respectively.

As this was the December to February period the loss was neither surprising nor alarming provided it could be stabilised at that level. Tucker and Simpson (1969), estimate that a ewe will consume 200 g/h of dry matter on a good stand of oats, and further that oats sown at different times have different yields. This is clearly demonstrated in the following analysis of two Cooba oat crops - Number 1 was grazed out and Number 2 was for grazing and grain:

	Crop No. 1	Crop No. 2
Sown	17/3	12/5
Graze	5/5	11/7
Weeks since sown	7	9
Days of first grazing	35	98
Stocking rate (S.R.) (no./ha)	37	12
Spell/weeks	5	Nil
Days of 2nd Grazing	72	Nil
S.R.	15	-
Total days of grazing	107	92
Av. S.R.	23	12
G.U.	2434	1210 (Not stubble)
Grain Prod. (t/ha)	Nil	1.25
Est. DM production (t/ha)	3t	1.5t (Not stubble)

Using the above figures we can estimate, given an average season, that in a controlled grazing situation (6 h/day), 200 ewes and lambs will require, 11 ha of grazing off a March sown crop. during the June to August period. Taking a wet ewe factor of 1.5 DSE:

IF

$$G.U. = \frac{\text{Days x Average Stock Numbers}}{\text{Hectares}}$$

THEN

$$Ha. = \frac{\text{Days x Average Stock Numbers}}{G.U.}$$

$$= \frac{92 \times 300 \ (200 \times 1.5)}{2500}$$

$$= 11 \text{ hectares (S.R. 27/ha)}$$

If one has a crop, and wants to know how long it will last the following method may be adopted. Cut one m^2 of the crop at sheep grazing height and weigh. The weight in kilos multiplied by 10 will give t/ha of wet matter. Take 25% of this answer to arrive at the dry matter and use this equation:

$$\text{Days of Grazing} = \frac{\text{Dry Matter/ha (kg)}}{\text{kg/Head x S.R./ha}}$$

$$= \frac{3000}{0.2 \text{ kg} \times 6 \text{ h} \times 27}$$

$$= 92 \text{ days}$$

A lactating ewe cannot get enough protein out of 6 hours of grazing and will therefore need supplementary feeding with hay or grain.

I have attempted to apply the same logic regarding grazing units and dry matter to lucerne pastures. Assuming that green lucerne supplies an energy value (E.V.) of 9.5 MJ/kg then a 55kg dry ewe requires 725 gDM/day to maintain her body weight. The following equations were used for the analysis:

$$\text{S.R./ha} = \frac{\text{G.U.}}{\text{Days Grazed}}$$

AND

$$\text{Dry Matter/ha} = \text{Days} \times \text{S.R./ha} \times 0.725 \text{ kg}$$

Paddock	**kgDM/ha**
3 yr old Alluvial	2105
3 yr old Dryland	909
2 yr old Dryland	1207 + Hay 2 t/ha
1 yr old Dryland	902
1 yr old Dryland	147 + 1800 (Hay 2 t/ha x (90%)

The records used for the above were not very well kept and I have converted all figures to a full time grazing basis. As they have all been treated exactly the same a general pattern is evident. Supplementary fodder was used during the 9 months recorded here - (15t oats and 300 bales of clover hay in 60 x 0.5t stacks.)

QUESTIONS WHICH NEED TO BE ANSWERED

Stock - How can we reduce the lambing span given that we have used fertility drugs and tried the 'ram effect'?
- How early can we wean lambs without losing bloom and on to what sort of feed?

Fodder - How long can we expect the new lucernes to last for grazing and hay in dryland situations?
- How much moisture is drawn out of the ground by frost and how does this affect the growth and grain potential of fodder crops?

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REFERENCE

Tucker, M. and Simpson, P. (1969), Managing grazing oats in Central Tablelands, Agric. Gaz. 80 (5):272-6.