Paper 17
LUCERNE GRAZING MANAGEMENT FOR THE 80'S

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INTRODUCTION

During the 1970's lucerne became a grazing plant of major importance in the drier regions of New Zealand. In spite of its widespread use, the best grazing management practices have not always been understood or applied, which has contributed significantly to the recent decline in its usage. This paper puts together our present knowledge into practical management systems, so that the advantages of lucerne in terms of dry matter yield and quality may be optimised. An understanding of the principles is essential if successful systems are to be devised.

SPELLING DURATION

Lucerne must be rotationally grazed with a long spelling period to achieve high production. The plant relies on a build-up of root reserves as it approaches maturity, to provide energy for rapid recovery growth. Frequent defoliation lowers these reserves, with consequent lower production, plant death, and invasion of weeds (Table 1). A spelling duration of 42 days is generally recommended although this varies with season. Lucerne quality declines rapidly as it matures, particularly in summer and autumn (Fletcher, 1976), when spelling period can be reduced to 35 days. Another guide is when the stand has reached 1% flower. Spelling duration is thus a balance between restoring root reserves but still supplying high quality feed to livestock.

TABLE 1: Effect of spelling period on lucerne over two years (Smallfield *et al.*, 1980).

	21 day spelling	42 day spelling
Dry matter yield (t/ha)	3.5	10.2
Weed content (Autumn, % yield)	76	7
Lucerne population (plants/m²)	21	52
Root weight (g/plant)	6	12

GRAZING DURATION

Grazing duration is a much more flexible time than spelling period. Contrary to our views of the 1960's (Iversen, 1967) we now know that grazing periods of up to 14 days cause little harm to a stand even though a shorter duration may produce slightly greater seasonal production (Janson, Paper 11). This enables us to use fewer paddocks and larger mobs in the rotation. Sheep eat the tender shoots and leaves of lucerne first, then the tender stem, and lastly the older basal stem. With a long grazing duration this older stem becomes low in quality, fibrous and unpalatable, and is often rejected (Fig. 1). This is less likely if the period is less than a week.

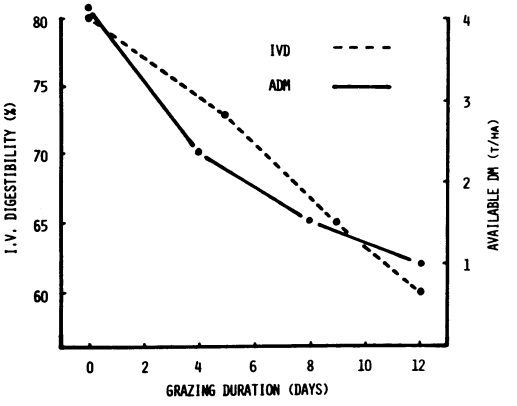

Figure 1: Changes in digestibility and available dry matter of lucerne during grazing (Cosgrove, 1978)

LUCERNE VERSUS PASTURE

On shallow stony soils in Canterbury lucerne will outyield pasture by 50% or more under optimum management, with a much lower annual variation (Fig. 2). Most of the dry matter is produced in the three spring months from mid-September to mid-December, while little growth occurs during winter. In contrast, pasture production is greater than lucerne in the cool season, although it is much less in the summer drought.

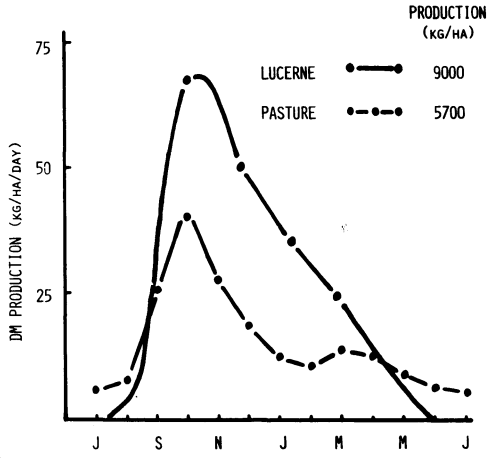

Figure 2: Comparative pasture and lucerne production — Lismore silt loam (source: Ashley Dene; MAF Winchmore)

PRACTICAL IMPLICATIONS

Winter Management

During winter, a single hard grazing with a large mob of sheep for a short period in June has considerable beneficial effects. Overwintering aphids are largely eliminated (Smallfield *et al.*, 1980) while weeds such as chickweed, annual poa and storksbill receive a severe check from hoof and tooth treatment. Provided that grazing is carried out in dry soil conditions little harm occurs. However, if grazing is delayed until July or August soils are likely to be wetter, and crown damage and nematode spread can be considerable. In addition, the decapitation of lucerne shoots will retard spring growth. During this period it is much better to use alternative feeds such as brassicas, hay, greenfeeds or grass.

Lambing or Calving

The period before and during lambing or calving is the most critical for lucerne management and a time when most harm is done to the stand. As lucerne starts to come away in late August and September, there is a real temptation to graze it, as high quality feed is at a premium at this time. Generally the higher the percentage of lucerne on the farm, the greater is the temptation. We now know that hard early spring grazing decreases later production substantially (Janson, 1975) and encourages rapid invasion by weeds. Although some early grazing cannot be avoided it must be kept to a minimum, preferably on the older, weedy stands. At low stocking rates sheep eat the weeds preferentially in early spring and leave the lucerne largely untouched (Brosnan, Paper 16; Talbot, Paper 13).

There are two management procedures which may be adopted to allow lucerne to be spelled at this time. The first is to supply alternative feeds. Pasture is ideal, as a large bank of feed can be built up under a slow rotation during winter especially if cool-season active species such as ryegrass and subterranean clover are present. The sowing of greenfeed Tama or Paroa ryegrass on a cultivated seedbed, in late February-March, is a common and reliable practice, while older stands of lucerne are sometimes overdrilled in autumn with the same species (Vartha and Fraser, 1978). Overdrilling of greenfeed is much less reliable than conventional sowing, and in a dry autumn may be a complete failure. In wetter districts, such as the pumice country, Nui ryegrass is overdrilled into older stands in the expectation that they will develop into ryegrass/white clover pasture as the lucerne disappears (Mace, Paper 12). A new concept is to establish the winter-growing Matua prairie grass as a pure stand of perennial greenfeed and thus avoid the cost of cultivation or overdrilling. Early spring growth can be stimulated in Matua or other greenfeeds by use of nitrogen fertiliser.

Hand in hand with alternative feed supplies is the practice of later lambing or calving to coincide with the later grazing requirements and better early summer growth of the lucerne (Table 2).

TABLE 2: Effect of lucerne on lambing or calving date (Mace, Paper 12; R.J. Diprose, pers. comm.)

Lucerne on farm	Lambing date (Light land, Canty)	Calving date (Pumice, N.I.)
Nil	August 1	August 1
25%	August 15	August 20
70%	September 7	September 1

Post-Lambing or Calving

Lucerne does not reach the optimum stage for the first spring grazing until early to mid-October, although this varies with cultivar, locality and previous management. After tailing, ewes and lambs can be rotated on lucerne until weaning, starting first on stands spelled in winter/early spring and moving later to stands recovering from early spring grazing. At this stage mob size is particularly important and should not exceed 800 ewes (Wall, Paper 14). Above this, real problems of mismothering may occur. Paddock number and size are also major factors to consider (Table 3). There may be

TABLE 3: Interaction of paddock size and number with two grazing periods, assuming 4,000 kg/ha lucerne DM on offer, utilisation of 65% and a ewe requirement of 1.8 kg/day.

	Grazing period (days)	
	7	14
Stocking rate (ewes/ha)	200	100
Paddock size (ha)	4	8
Paddock number	7	4

4,000 kg/ha of dry matter on offer in late October, of which 65% may be consumed. Ewes require about 1.8 kg d.m. daily at this stage, and if lucerne is defoliated over 7 days then stocking rate will need to be at 200/ha. For a mob size of 800, paddocks should be no larger than 4 ha with a total of 7 in the rotation. If grazing duration was extended to 14 days, then stocking density could be reduced to 100 ewes/ha, paddock size enlarged to 8 ha and the total reduced to four.

Lucerne digestibility is lower than pasture, due to the high stem fraction, and no attempt should be made to clean up the stubble at each grazing, or milk production and lamb growth rate will fall. This stem residue is sacrificed as it will not be consumed at a later grazing. For maintenance of high growth rates 7 day grazing is preferable to 14 days as animals are being presented with leafy high quality material more frequently, and are not forced to eat stems. However there are greater management problems, although large paddocks can be split temporarily with an electric fence.

On dairy farms in the pumice country, intensive management of lucerne is well accepted and most farmers use a daily shift, thus maintaining high quality feed on offer (Mace, Paper 12). Bloat is controlled by drenching cows before they go on to a fresh break. Stubble stems are either cleaned up by following dry stock, or are topped with a mower.

In late spring-early summer, as a surplus develops, lucerne paddocks can be closed for hay. Provided that winter grazing has been carried out, aphids should be no problem until early November, after the first grazing (Table 4). Grazing management should continue to keep them in check, but if a high population builds up in late November it may be necessary to spray. Sodium levels are sometimes low in spring lucerne, particularly in Rotorua/Taupo and parts of Canterbury, and this can retard growth of lambs and milk production of dairy cows. It is a good practice to supply salt to ewes and lambs, or cows especially on pure stands. Weeds usually contain much higher levels of sodium than lucerne and therefore the problem is not so great in weedy stands. (Jagusch, Paper 9).

TABLE 4: Effect of winter grazing on numbers of aphids on lucerne in spring (Smallfield *et al.*, 1980).

	Aphids/stem on 31 October
Grazed April only	100
Grazed April and June	7

Post-weaning

Once lambs have been weaned, the ewes can be boxed into bigger mobs, using larger paddocks, and grazing durations of 14 days. Lambs should precede the ewes in the rotation so they eat the tender shoots and leaves. In dry seasons when quality feed is short, lambs can be early-weaned quite successfully, at 4-6 weeks age, provided they are 12 kg or more liveweight (Jagusch, Paper 9). At this time of year grazing with ewes can be quite hard, so they clean up the stems and weeds. There should be little need for regular annual chemical control of weeds in lucerne, if the correct hard summer and winter grazing is carried out and rotational grazing is practiced generally. Weed problems are a reflection of unthrifty lucerne due to inadequate nutrients, pests or diseases, or poor grazing management.

Autumn Management

Lucerne growth in late summer and autumn is quite variable, a reflection of the wide-ranging rainfall pattern and drought in many districts. Where leaf diseases are present or aphid attack has occurred, oestrogen levels may be high and lucerne should be avoided for about three weeks before, and three weeks after, the commencement of tupping. However, lucerne free of leaf diseases or aphids has low oestrogen levels and is quite safe for flushing and tupping. Young leafy growth is best, or a cultivar resistant to leaf diseases.

CONCLUSIONS

Lucerne requires a high standard of management to achieve its potential. Under poor management lucerne grazing may be a disappointing and costly exercise. Because of these management problems and the overall lower digestibility compared to pasture, grazed lucerne needs to produce at least 30% more dry matter than pasture to economically replace it. Yields of lucerne on pumice soils in the North Island are 50% higher than pasture, and the marked swing to lucerne has been a major reason why milk fat production has increased 65% in the Rotorua district in the last 10 years. At Ashley Dene where lucerne outyields pasture by 100%, stocking rate has risen from 8 to 13 ewes/ha with the introduction of lucerne.

The proportion of lucerne on a farm depends on its advantage over pasture. If the advantage is very great, then the increased management difficulties of 50-60% lucerne can be tolerated.

Lucerne seems to survive mismanagement better under dry climates (<400 mm rainfall) than wet, or under dryland farming rather than irrigation. Correct management

procedures are vital in moister environments, where stands will yield well for 8 years under good management, but may disappear in 2-4 years otherwise.

We have reached a stage where grazing requirements of lucerne are well understood, and it is in the hands of advisers and farmers to integrate the management with animal requirements. In dry climates of New Zealand where this is done intelligently, lucerne pastures can result in much higher stocking rates and performance and improved net incomes.

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DISCUSSION

McFadden: Does the 50% dry matter advantage of lucerne over conventional pasture still occur today, and if so where?

White: Yes, on the shallow soils, Lismore and Eyre soils, on the lower plains.

Joblin: What evidence do you have for the statement that mobs of ewes with lambs should not exceed 800?

White: The observation of Wall (Paper 14) and O'Connor (1970) and farmer experience.

Wall: The higher the stocking density the smaller the mob size must be, and 800 appears to be the upper limit at high-stocking density.

White: At Ashley Dene, Nui ryegrass has been sown in recent years because of under-current problems, but Nui has given little production from October 1980 to May 1981, where lucerne has responded to the small amounts of rain that has fallen over this period.