

# HILL COUNTRY GRAZING MANAGEMENT

M. E. SMITH and A. D. DAWSON

*Advisory Services Division, MAF, Hamilton*

## *Abstract*

Conditions that warrant the development of a new approach to hill country grazing management are outlined. The effect of three grazing systems on pasture growth and species composition is discussed. Livestock feed requirements are related to pasture production. An action calendar shows the modifications to the grazing system which allows better exploitation of the pasture and stock potential. Finally, results of the adoption of the recommended grazing systems are given.

## INTRODUCTION

IN New Zealand there are approximately 4.5 million ha of hill country supporting 31 million stock units. This hill country will in the foreseeable future remain a major resource in the national economy. Much of this land will remain in pastoral farming. Because hill country is likely to remain as grassland longer into the future than other land areas, it is desirable that the Grassland Association place major emphasis on the factors influencing optimum pasture production from hill country. Also in the future hill country pasture will continue to be utilized by the grazing animal. Therefore, the art or science of grazing management, the combining of good pasture husbandry with allocation of feed to animals at the desirable level, needs constant reassessment in the light of new technology, changing economic factors, the present state of hill farms, and, not the least, the knowledge level of the hill farmer.

## DEVELOPMENT OF THE HILL COUNTRY GRAZING MANAGEMENT SYSTEM

In 1973 it was noted by Farm Advisory Officers of the Hamilton region that hill country stocking rates had declined. Despite this decrease, individual animal performance, particularly that of the breeding ewe, had remained static. It was considered that ewe liveweights were too low to achieve satisfactory performance. In 1974, the Te Kuiti sub-region advisers carried out a survey which confirmed this view (Parker et al., 1974). Further investigation revealed that the manner in which pasture should be grazed to encourage the growth of improved pasture legumes

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(*Trifolium* spp.) and ryegrasses (*Lolium* spp.) was not clearly understood. It was recognized that hill country farmers usually have between 15 and 25 major grazing paddocks and five to six mobs of stock.

The effect of management on total pasture yield and species composition is illustrated by a description of three basic grazing systems.

Under a set-stocking system, animals graze the pasture almost continuously. As would be expected from agronomic principles (Smetham, 1973), pasture plants are not given the chance to express their potential for regrowth. The more erect growing grasses such as ryegrass and cocksfoot are affected more than prostrate species such as browntop. The more palatable clovers tend to be overgrazed, existing only as stunted plants, and do not develop the vigour which will bring about effective nitrogen fixation. This can result in a loss in nitrogen input and a reduction in efficient use of applied fertilizer. It is recognized that set-stocking does allow spelling since animals do not defoliate each plant daily. However, the process is uncontrolled and often highly selective and at meaningful stocking rates leads to lower production and utilization.

The second system may be called the "shuffle". It is an attempt to introduce the rotational effect, but, with a limited number of paddocks and five or six mobs, the effect must be to lengthen the grazing period or shorten the spelling period of the pasture. The result offers little improvement on set-stocking — that is, the more erect growing or palatable species will be affected most and total pasture production reduced.

The third system is true rotational grazing. Here the pasture is grazed for a short time and spelled for a long time. The time pasture is spelled is dependent upon season and climate. By treating pastures in this way, the more erect, improved species of grass and the more palatable legumes are encouraged (Jones, 1933; Brougham, 1970). Plants seem to be more productive when grazed in this manner. In winter a greater leaf area allows them to intercept more light. In summer a more substantial root system is capable of drawing moisture from a deeper, moister layer of soil. Improved pasture cover in summer can also ensure a better soil moisture regime (Brougham, 1970).

Arising from this definition of rotational grazing the following guidelines have been applied to hill country grazing management:

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- (1) Do not graze a pasture for more than three days with the major grazing mob. This minimizes the setback to pasture regrowth and maintains a more vigorous pasture.
- (2) Keep the spell between major grazings long enough to maximize pasture response.

An example of the minimum length of spell at present adopted for the Hamilton region is: Spring, 12 days; summer, 3.5 days; autumn, 35 days; winter, 35 days.

The minimum length of rotation may be reduced to 25 days in summer but only if substantial rain falls. In colder regions the minimum length of the winter rotation recommended is 40 days plus. A rotation longer than the minimum in winter allows stock to be moved early after periods of heavy rain. Simply growing more pasture does not alone ensure more lamb, wool or beef. Both the stock feed requirements over the year and their relationship to pasture growth must be understood to achieve success.

The essential points to note about the feed requirements of the breeding cow and ewe in Fig. 1 are:

- (1) The need to increase feed, to three times maintenance for the ewe and to a little over twice maintenance for the cow once their offspring are born. This is a considerable increase over May feed requirement.
- (2) Ewes should be fed to gain liveweight immediately after weaning, not fed at maintenance as suggested by the "classic" feed requirement graph. Realize, the time from

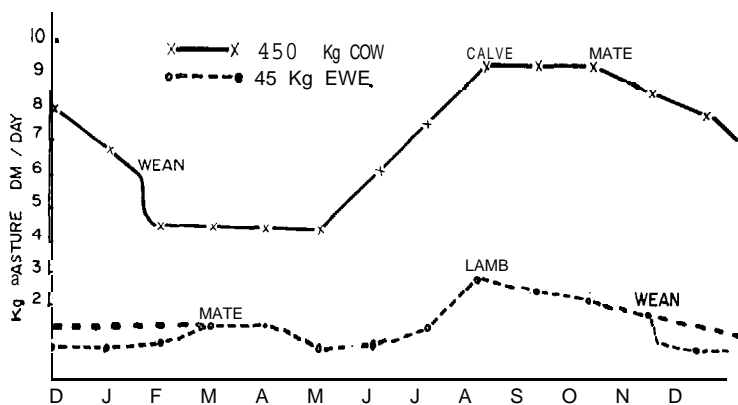


FIG. 1: Daily feed requirements of breeding cow and ewe.

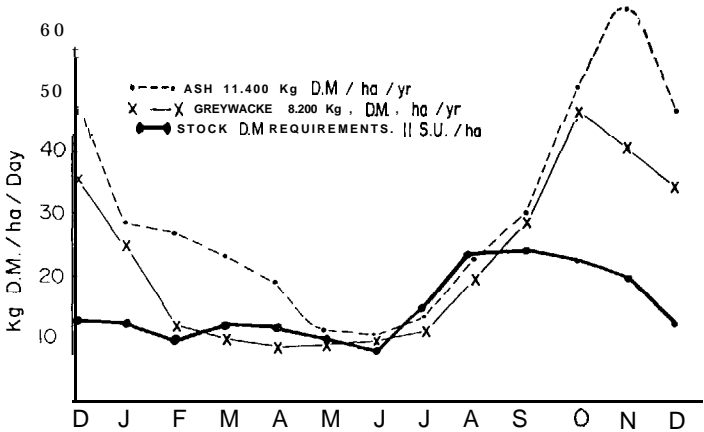


FIG. 2: Pasture growth rate on hill soils.

weaning to tupping is relatively short and it has been shown that for every 5 kg increase in ewe liveweight between 40 and 60 kg a 10% increase in lambing can be expected (Hight and Jury, 1973).

In Fig. 2 an endeavour has been made to relate the feed requirements of the total stock on the farm to average hill country pasture production, in this case for two soil types (Gillingham, 1973).

Two points can be made:

- (1) Flushing ewes for increased fertility may not be practical on hill country. This creates the need to place greater emphasis on the liveweight effect on lambing percentage.
- (2) The time in spring when pasture growth exceeds stock requirements can be predicted and effective early pasture control measures taken.

Effective early control means:

- (a) Allowing ewe hoggets or cows and calves access to more feed as soon as this is available.
- (b) Maintaining ewe milk production at a higher level by retaining pasture quality (Rattray, 1975).
- (c) Allowing surplus pasture to be conserved as silage and/or hay at a time when it is a true surplus and of high feed quality.
- (d) Increasing pasture production in the summer and autumn periods.

All of the above ideas for improved animal and pasture production must be combined into a grazing management plan or action calendar for the whole year. A key point is that the hill country farmer is limited in the number of paddocks on his property. Therefore, to obtain an adequate length of rotation, the various classes of stock with similar feed requirements have to be combined. The major grazing group may contain all the breeding ewes and cows during some periods of the year. This could represent as much as 85% of all the stock units on a breeding property.

By drawing up an action calendar, recognition is given to the fact that the grazing practice in one period can affect both the quantity and quality of pasture available to the stock in a subsequent period (Smetham, 1973).

The calendar (Fig. 3) can be considered in more detail, starting with lambing.

- (1) The stock are set-stocked as close to lambing as is practical. Cows should be break-grazed with a mains electric fence and late lambing ewes and ewe hoggets can be stocked separately at a higher relative stocking rate. Because of the high feed requirements of the breeding stock at this time, the whole of the farm area should be used for grazing.
- (2) In anticipation of excess feed in September and October, the stocking rate of the lambed ewes will be increased to allow more feed for late lambing ewes, cows, ewe hoggets and finally conservation of silage or hay.

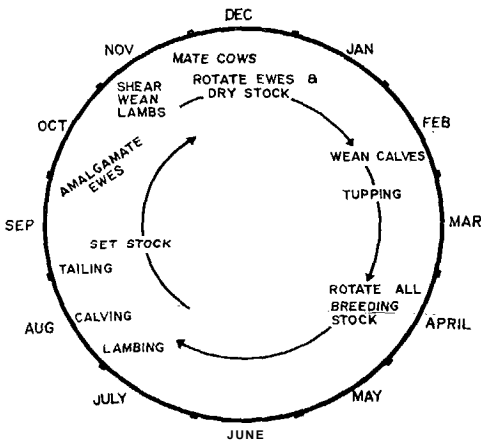


FIG. 3: Action calendar.

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- (3) Lambs should be weaned by an average age of ten weeks. This allows ewes to be shorn and begin on the rotation of the whole farm as early as possible. Also included in this major grazing mob are rising two-tooth ewes, rams and dry cows. As the drier summer approaches, the length of rotation is increased from an initial 21 days to 35 days. This spelling of pastures before the end of November is most beneficial in increasing clover content.
  - (4) Ewe hoggets and cows with calves may be run together depending on the actual size of these mobs and individual farm conditions. These priority stock graze paddocks with good feed following an adequate spell from grazing. Priority stock are not expected to eat a high proportion of the feed in any one paddock and are not therefore limited by the maximum of three days' grazing rule. No paddock should be grazed in consecutive rotations by only priority stock as this could lead to poor utilization and loss of pasture control.
  - (5) At weaning the breeding cows join the major grazing mob. The retention of steer calves on the property means that the timing of weaning can be related to the feed available and not to a fixed time such as sale date. It is recommended the retained weaners be run on a separate intensive beef unit; they may, however, be grazed with the ewe hoggets.
  - (6) If feed is available, the length of rotation may be reduced over the flushing/tupping period.
  - (7) The length of rotation is increased from tupping to three weeks before the start of lambing. Paddocks required for break feeding to breeding cows should be last grazed by the main mob one rotation length before break-grazing commences.
  - (8) Three weeks before lambing the length of rotation is gradually reduced to even out the feed available on the lambing paddocks, and to increase the feed intake of the ewes. The ewe hoggets may be set-stocked at this time.

This approach outlines the principles of grazing that should be followed and offers guidelines which allow the hill country farmer to plan his grazing management. This hill country grazing system has been applied within two major resource limitations:

- (1) A lack of cash for capital inputs.
  - (2) A limited number of paddocks.
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## RESULTS

About 300 farmers have adopted this hill country grazing management system over the past two years. They have found advantages in both physical management and performance. Many beneficial effects of employing this grazing system can be seen in the short term. However, it could take up to three years before improved pasture species are dominant. Also it will be five to seven years before all ewes in the flock have the benefit of being born and reared on the system.

Some of the benefits as seen by adopting farmers are:

Owing possibly to the simplification brought about by reducing the number of mobs on the property, farmers feel they are better able to plan feeding of stock and to allocate feed more in line with animal requirements than was possible under previous systems.

It is considered that feed is utilized more efficiently and/or that more feed is grown under this system. This is judged by the fact that pasture is grazed more evenly. Also savings are made by a reduction or elimination of hay feeding while maintaining or improving stock condition. In many cases farmers have gained confidence to increase stocking rates. It is recommended, however, that farmers begin the system with present stock numbers.

Clovers and ryegrasses emerge as dominant species under the grazing system. Many farmers consider they have never had as much clover present in pastures. This is most evident in early December.

The performance of young stock, particularly lambs, is very good. A comparison of the advantages of a rotational system over set-stocking are shown in figures recorded on a Tauranga property. These show, Table 1, an advantage to rotational grazing of 7 kg in hogget liveweight in November after being run

TABLE 1: TAURANGA PROPERTY HOGGET PERFORMANCE

Grazing Group	No.	S.U. ha	Liveweight (kg)		Fleece
			End Treatment (Nov.)	Pre-mating (Feb.)	Weight (kg) Fleece Wool (Mar.-Oct.)
Rotational	550	15.6	45.5	50.5	2.28
Set stocking	1250	15.6	38.5	44.6	1.73
Difference			1.0	5.9	0.55

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at equivalent stocking rates since March. This advantage was only reduced to 5.9 kg by February after both groups had been rotational grazed from October. Based on these weight differences at mating, about a **12%** advantage in lambing percentage in favour of the rotational grazed hoggets can be expected.

The increase in hogget fleece wool over the March to October period was 0.55 kg, or **32%**, in favour of rotational grazed hoggets.

While planning is easier for owners, on farms where labour is employed, workers enjoy working in the knowledge that stock are to be shifted on certain days and on others a full day can be organized on other jobs. As one farmer put it, "every two or three days, one of us shifts stock and **the** other does something else, like — go fishing."

Ease of stock movement is uppermost in the minds of farmers contemplating adopting the rotational grazing system and running large mobs of stock. The following shift procedure is recommended :

- (1) Open the gate.
- (2) Shift any cattle through and away from the gateway.
- (3) Stay by gate or more congested area to guide stock,
- (4) Complete any straggle muster required.

#### CONCLUSION

Overall, farmers have applied the principles to many different farming situations. The hill country grazing management system has given the results predicted and farmers are satisfied with the change.

In conclusion, we would say the hill country grazing management system outlined forms **the** base on which farmers can plan grazing management. It is a framework on which can be built sound grazing management. It does not restrict or eliminate management. Experience with the grazing system suggests that adopting this approach does offer a means to increased production without increased costs.

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