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FIELD OBSERVATIONS OF THE EFFECT OF GRAZING MANAGEMENT ON PASTURE PRODUCTION ON A SOIL OF VOLCANIC ORIGIN

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THE AIM of this paper is to present some ideas applied by dairy farmers with very good results in the South Taranaki area, rather than to present data on actual pasture yields. By so confining remarks to field observations on a particular soil type, the risk of claiming these ideas as basic principles of either grazing management or pasture growth is avoided.

An attempt will be made to cover a full season's grazing pattern, and thereby avoid singling out one period only and placing so much emphasis on it as to overlook the effects of such short-term management on the stock and pasture requirements for the rest of the year. Such a system is not claimed to result in maximum yields of pasture dry matter per acre, but it can be said to result in a high degree of pasture utilization if associated with a high stocking rate, so giving a high level of animal production for a fairly limited amount of physical effort.

To understand how such a system has evolved requires a knowledge of possible critical periods under our seasonal dairy-ing conditions, where high stocking rates are being carried on farms of relatively high induced fertility.

These critical periods are early spring (September and early October), summer (January and February), and winter. Each of these periods will be dealt with in turn, and some of the methods used in overcoming their feed shortages, will be outlined.

The months of August, September and early October do not produce sufficient feed to supply the freshly calving cows. It is relatively easy to fill in the August and early September gap with feed saved during June and July, so late September and early October become a critical feed period. What are some of the steps which can be taken to ease the situation?

- (1) Ration what grass is available, and supplement it with silage or hay.
- (2) Delay the herd calving date by a week or 10 days. This will effectively cut down milking feed requirements by an

equivalent period of time. In an area not subject to frequent droughts this can be a very effective way of shortening this late September critical period without a subsequent loss of autumn production. This delayed calving does not entail a shorter lactation because herds treated in this way can be milked into June.

- (3) On heavily stocked farms, artificial nitrogen can be used with the knowledge that the grass it produces will be converted directly into milk. By delaying application until mid-August this nitrogen can be used with reasonable confidence of getting a response, yet still produce the grass when it is required. (This early boost of grass growth may help bloat control.) On fertile farms top-dressings of superphosphate and potash in June or early July appear to give additional early growth, and so effectively start the spring flush earlier than normal.
- (4) By avoiding pugging during the winter and by oversowing a little H1 ryegrass round any trampled areas, it is possible to have the whole farm at a growing stage at the time when every extra day's feed is so vital.
- (5) In extreme circumstances, meal may be fed—"extreme", not because of the cost, but because few milking sheds have the equipment or the labour to handle meal feeding.

It is of the utmost importance to have an estimate of when good growth is likely to start—this is obtained from past experience. A few kindly days in late August should not be allowed to lead to the belief that it is going to be an early spring, and that it will be safe to feed a more generous ration. A level of 80% feeding, maintained over, say, 60 days, seems infinitely less harmful to production than a level of 100% feeding for 48 days followed by near starvation for 12 days.

Earlier mention of a crop has been avoided because there is no crop available to feed at this time. While a winter crop may be useful under some conditions, the same crop would have the effect of reducing the area of the farm in pasture during late September, so aggravating the situation. The other possibility would be a summer crop, sown to grass the previous autumn. This could be quite productive by the following September if it had been sown predominantly with H1 ryegrass.

However, there is the risk that, in the endeavour to cover the front, the rear is exposed. The strong spring growth of H1 will suppress summer species and create a further summer problem. For this reason, the alternatives mentioned earlier are preferred.

While the September-early-October shortage is always encountered, a second period of shortage may occur in January-February, but this is not nearly so predictable. This period may be filled in with a summer crop, and in areas of frequent and severe drought this is no doubt a suitable choice. In areas such as those referred to, droughts are infrequent and summer crops suffer from the following draw-backs :

- (1) A crop will be necessary only one year in every three or four, but the cost of growing the crop must be met each year.
- (2) Since the time of onset of this period of shortage is uncertain, one cannot readily decide in spring when to sow the crop so that it will be ready at the correct time. In the present summer it would have been necessary to have had the crop ready to feed by late December to have been of full benefit.
- (3) The weakness of an H1 dominant pasture has already been referred to. If a more mixed pasture is sown, it will take three to four seasons to come into peak production. So, while the summer crop may help the feed situation in itself, the pasture that follows it will be reduced in yield for three or four seasons.
- (4) There seems to be considerable doubt as to the ability of summer crops to sustain a high level of production.

The alternatives used in practice are :

- (1) The rationing of what grass is available.
- (2) The application of superphosphate and potash in October to boost December growth, and trying to carry this into the late summer.
- (3) The saving of silage aftermath or the aftermath of early cut hay on paddocks which have been well top-dressed; then rationing this off. The writer has seen this rationed at a rate of $\frac{1}{2}$ acre per 24 hour day to 95 cows, with a level of $1\frac{1}{4}$ lb of butterfat per day being maintained after 30 days of such rationing. While this was being rationed the remainder of the farm was spelled. The use of nitrogen to increase the aftermath growth of hay or silage paddocks has not been seen, but at times such a step may be well warranted.
- (4) More drastic steps to meet extreme conditions would include the culling of known culls, feeding out of silage and, finally, the use of meal.

The remaining critical period appears to be in the winter months. This, although a period of poor growth, should not be a period of feed shortage, for prudent farmers will have set

aside reserves of bulky feed for this time. It does appear, however, that much of the future production of pasture and animal hinges on the treatment of both over this period.

Four systems of wintering commonly practised can be outlined. One of these seems preferable for most seasons, but others have equal merit to meet the special conditions of an unusual season.

THE CROPPING METHOD

Under this system it is the practice to use a sacrifice paddock during winter. This paddock is then cropped for the following winter.

Advantages

- (1) On undeveloped or partly developed areas this system smoothes the land surface for future mechanical operations.
- (2) Under conditions of long and severe winters, such as may be experienced on the higher altitude farms of South Taranaki, it is sometimes difficult to provide sufficient supplement in the form of hay and silage. This method, by depriving the stock of some grazing throughout the season, accumulates this saving, for feeding out in periods of greater need.
- (3) It is a useful emergency measure after a drought period, when there are insufficient reserves for the winter.
- (4) It confines mud to one area.
- (5) It permits the establishment of new pastures, and where these are better than the old ones this is an advantage.

Disadvantages

- (1) It reduces the area of farm which is growing grass for late September feed by the area of the crop plus the area of the sacrifice paddock (*i.e.*, at least 10%).
- (2) There are hazards due to army-worm, aphid, turnip fly and weeds.
- (3) There are problems of crop diseases.
- (4) There is a danger of inducing red-water and bloat.
- (5) It gives very poor utilization of hay and silage, since these are frequently fed under muddy conditions. Even under dry conditions, the big mob of stock following the line of feeding out treads in much of its ration.
- (6) It gives no controlled preferential feeding; in fact, it may allow the fatter, late calving cow to gain an advantage.
- (7) It transfers fertility.
- (8) It cuts up gate-ways, trough surroundings, and perhaps races.

THE SINGLE MOB METHOD

Under this system no crop is grown, but cows are kept in one group and fed hay or silage while being slowly rotated round the farm.

Advantages

- (1) It saves the cost and labour of cropping.
- (2) There are benefits through winter treading and the cleaning out of each pasture in turn.
- (3) Under dry, winter conditions this system gives fairly good utilization of hay and silage.
- (4) It is an easy system to work.

Disadvantages

- (1) It does not allow for preferential feeding. Any attempt to increase the ration for the benefit of the thinner, or early calving cows will be taken advantage of by the fatter, late calving cows.
- (2) One wet night at this level of stocking will pug one paddock, and several wet nights will mean several pugged paddocks.
- (3) Cows under this system will tread in some of their feed when following the trailer at feeding out time.
- (4) Cows will tend to wait round the gate, particularly when they hear the tractor coming, and so pug this area.

THE MULTIPLE MOB METHOD

The cows under this system are divided into separate mobs, and more or less set-stocked over approximately 50% of the farm and fed according to their needs.

Advantages

- (1) There is preferential feeding according to needs.
- (2) There is little fear of pugging, provided the stocking density is sufficiently low.
- (3) The treading, yet avoidance of pugging, is beneficial in encouraging perennial ryegrass and white clover. At the same time it gives good control of Yorkshire fog, browntop, and other creeping grasses. A dense sward, able to intercept maximum light, is thereby developed.
- (4) Good utilization of hay and silage is achieved, since these are always fed out on clean ground to relatively small mobs, and so are not trodden on to any great extent.

- (5) The spread of fertility is controlled, so allowing improvement of pastures of lower fertility level, and at the same time giving a large proportion of the farm the benefits of a dressing of dung and urine.
- (6) There is no cutting up of gateways.
- (7) It demands less labour than a system involving cropping.

Disadvantages

- (1) There is more trouble in feeding out than under a system where stock are kept in one mob.
- (2) It reduces the area of farm closed for autumn-saved pasture. This is no problem on fertile farms as winter-saved grass will supply requirements in August and early September, and no system of autumn-saved pasture can effectively overcome the late September shortage.
- (3) It is not a suitable system to use on sidelings owing to the amount of sliding by stock on these areas during periods of high soil moisture content.

THE AUTUMN-MAINTAINED PASTURE METHOD

This involves wintering on autumn-saved grass to varying degrees. To do this it is necessary to restrict the grass intake of the cows in the late autumn and supplement their ration with hay, silage or crop.

Advantages

- (1) This system can be very useful in seasons when short of winter feed, because by drying cows off early it is generally possible to get the necessary build-up of grass.
- (2) It is useful in seasons of abnormally good autumn growth when some of this can be carried into the winter, so allowing a saving of the normal supplements.
- (3) Although the cows are confined to a small area, they seem to do very little pugging. This is possibly due to the fact that they do less walking under this system than under others.

Disadvantages

- (1) To build up autumn grass generally results in a loss of autumn production from cows that are in their 6th, 7th or 8th month of lactation. To off-set this by earlier calving would put increased stress on the late September period.
- (2) There is no preferential feeding.

- (3) The long rotation between grazings (often 60 days or more) followed by closing again for spring feed leads to an open type of sward of poor light-intercepting ability.
- (4) The lack of prolonged treading fails to hold Yorkshire fog in check as well as some of the other systems do.
- (5) It involves additional work in moving the electric fence, and possibly a back fence.
- (6) There is a considerably extended period of feeding out. The fact of feeding out less per day is of little benefit as a daily labour saver.
- (7) There seems to be an increased risk of milk fever.

Of these systems, the writer prefers the multiple mob method in which groups are fed each according to their needs. In practice this system seems to require the least amount of supplementary feed. This may be due to better utilization of the supplement plus a better apportionment of this, according to the various group requirements. It may also be that such a system of more or less set stocking during the winter period results in an increase in pasture growth and utilization.

To quote one case: on an 82-acre farm milking 95 cows the winter is provided for by conserving about 16 acres of silage and hay—*i.e.*, a level of 6 cows per acre of conserved feed. This herd produces at a level of 370 lb of butterfat per cow on Herd Test data, so is presumably well fed.

Management for the remainder of the year—that is, in late spring, early summer, and the autumn period up to early June—can range from uncontrolled grazing to a 12-hourly rotation. The practical advantages and disadvantages of these systems seem to be more associated with farm lay-out than anything else. However, as a preference for other periods has been stated, this must be done again if only to be consistent. Accordingly, it is felt that a system of 12-hourly rotation round the farm, trying to alternate night and day grazings but frequently reviewing this general plan, is preferable.

To summarize, a grazing management system which seems to give good results for South Taranaki is one in which break feeding in August, September and early October is practised, while top-dressings of nitrogen, superphosphate and potash are used to boost growth over this period. Delayed calving will reduce feed demand, and the avoidance of winter pugging will have the pastures in a productive state.

For the remainder of October, and for November and December, a 12-hourly rotation round the farm, keeping pastures

well controlled even at the expense of maximum milk production per cow, is preferred. To do this the grazing area must be reduced by withdrawing paddocks for silage and hay. Some of these silage paddocks will be closed from mid-September onwards to ensure early cuts and good aftermath. On a twenty-paddock farm such a system will give 7 to 8 day intervals between grazings.

For January and February, the saved aftermath of silage and early cut hay should be rationed, and any boost to possible growth by application of top-dressing in October is taken advantage of while the remainder of the farm is closed.

In March, April and May, a 12-hourly rotation is again introduced with 10 to 11 day intervals between grazings since no areas are closed for hay or silage.

In early June, the cows are dried off, and, prior to being split into groups for the remainder of their dry period, are used to clean cut thoroughly the areas to be closed for August and early September feed.

Such a system of grazing, by rationing in periods of shortage, makes considerable use of the cow and her apparent ability to meet temporary periods of shortage. At the same time, it aims at reducing the wasteful processes of conserving grass in the form of hay and silage to a minimum. It is also a system of compromise in which maximum production of both pasture and animal over the short term may be sacrificed for the good of total seasonal production. For example, it was mentioned that late September was a period of shortage, yet closing silage from mid-September onwards with the idea of getting early cut silage and good aftermath for January and February feed was suggested. The loss of a couple of days' grazing in September would be more than offset by assuring 15 to 20 days' grazing in the summer.