SOME ASPECTS OF GRASSLAND FARMING IN SOUTHLAND

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The farming of any particular region must be approached from the aspect of climate. My placing of Southland as a climate would be midway between the climate of the greater part of the North Island of New Zealand and that of the lower half of Britain.

The vital demarcation line imposed by winter temperature is that which allows out-wintering of stock as against the necessity or desirability of wintering that stock indoors. Britain generally indoor winters its dairy cows, in-court winters its beef cattle, and to a large extent in-fold winters its sheep.

These practices involve hand or control break feeding of stock for approximately five months of the year.

I would say as a generality that growth from pasture practically ceases for about six weeks in the winter in the North Island and about three months in the South Island, as against approximately five months in Britain. These periods would represent the normal growth from old-established permanent pasture and do not include the possibility of some growth from special-purpose winter-growing pastures, botanically constituted, particularly fertilised, and specifically graze-managed to give some in situ winter feeding.

Britain feeds its stock during the winter on a small amount of outdoor grazing, the main winter feed being hay, silage, dried grass, sugar beet leaf and pulp, marrow-stem kale, field cabbage, residues of broccoli crops, roots, and home-grown concentrates, mainly oats, barley, and broad beans. Imported concentrates such as decorticated nuts, cotton cake, linseed meal, maize meal, bran, pollard, etc., supplement the home-grown feeds.

The in situ fed-off winter crops-turnips, swedes,

chou moellier and thousand-headed kale or some of the hybrid kales being bred at the Crop Research Division at Lincoln-are in my opinion the soundest proposition for Southland. Along with these, and following the crop cycle around the farm, we at Grasslands are convinced that the special-purpose winter-growing grasses, with or without, a cereal, ryecorn, or barley if autumn sown, can help out the winter considerably in Southland provided closer attention is paid to a more liberal diet of compounded artificial manures for these special-purpose winter-producing pastures.

We at Grasslands are playing round with the possibility in the north of reducing the winter need for so much silage and for a reduction of the winter root and/or forage crops. Our policy for the north is more to recommend a winter break-up of grassland-approximately one-tenth of the farm-and put this in the early spring into a summer forage crop that is utilised in the summer in time to prepare the land for a specially constituted pasture, autumn sown. This pasture will then provide late autumn, winter and early spring grazing in such amounts as largely to eliminate the need for winter supplementary crops. A small amount of silage and/or hay may be made as a safeguard against too severe a winter and a particularly late spring. The need of winter forages and/or winter roots in Southland is obvious. In Southland as a general rule there is not as great a need for summer forages as there is in the North Island, although you will still need the rape to finish off weaned lambs.

Intensive grassland farming in both the North and South Island demands a regular break-up and resow policy. The more I study this subject of really intensive grassland farming the more I am convinced that we just cannot afford to scrap the plough or to extend too long the life of any one particular piece of grassland. That life is about ten years in the North Island and about six to eight years in the South Island.

I regard Southland as one of the really high potential grassland regions of the world. The ploughable acreage is high; there is ample rainfall; the soil types are amenable to treatment; the temperatures are not undulp low and there is a good equable summer temperature; the farmers are drain conscious, are plough conscious, and are crop conscious ; I think over lime conscious, and insufficiently nitrogen and phosphate conscious. I would like to add to this a consciousness of the potentialities that lie in the newer special-pur-

pose pastures efficiently graze-managed and adequately fertilised with a fertiliser compound containing some nitrogen.

There should be little or no browntop in Southland on any of your ploughable country, I have studied the ecology of this species more carefully than any of the other grasses that volunteer into our sown swards, and I can say definitely that if the soil fertility status is kept up to the ryegrass-white clover level and provided good strains are sown, browntop will not invade the land. Practically the whole of the red tussock country of Southland is potential browntop land, and any potential browntop land with appropiate treatment is potential ryegrass-white clover-crested dogstail land.

Southland has a name for timothy and this grass does seem to do better in Southland than in any other province in New Zealand.

Southland seems very suitable for growing cocksfoot for seed. I would like to commend that venture to you as a rapidly expansible industry for Southland. This applies also to timothy for seed. Nitrogenous fertilisers are used extensively for the seed crop of both cocksfoot and timothy in Britain and the more general practice is to give 3cwt. of sulphate of ammonia or nitro-chalk in the autumn after the harvest and a further 3cwt. of either of these when. the crop is shut for seed in the spring. More nitrogen for the seed crop in Southland is recommended.

The fertile, easily ploughable country of Southland presents little or no difficulty once this has been adequately drained and reasonably well limed. Open grazing and winter feeding mid-June to mid-September is the major problem, both in dairying and in fat lamb production. I can see no way round this difficult season other than special-purpose crops and forages, together with special-purpose pastures, and some hay and maybe silage for the dairy herd. The root and forage crop also paves the way for the special-purpose pasture and it is I think in the development of these pastures together with roots and forages that real progress in Southland lies. Italian ryegrass and short-rotation ryegrass will improve the winter feed position in Southland. The new strain of timothy also gives more growth than your local strain. The bred strain of white clover, broad red clover, and Montgomery red clover included in the special-purpose pasture will help materially over the summer period provided the cor-

rect management is followed to allow the red clovers a chance to express themselves.

The real difficulty at first in these newer special-purpose pastures is to get a sufficient number of paddocks of them into action over the farm to ensure the appropriate rotational grazing and special-purpose management that these demand. The aim should be to have at least four of these paddocks and in the aggregate I would like to see half the farm in special-purpose pastures. These pastures will serve as such for say three good years, and then will develop into general-purpose pastures for another three to five good years, so that once the farm has been ploughed, cropped, and resown, the normal crop cycle may be quite appropriate to the maintenance of the special-purpose pasture cycle.

THE SEED MIXTURES FOR SPECIAL-PURPOSE PASTURES

We can consider two sets of special-purpose pasture mixtures for Southland.

1. Dominant short-rotation ryegrass and red clovers, merging later into a dominantly perennial ryegrass, timothy, cocksfoot and white clover sward.

201b. Short-rotation ryegrass.
10lb. Perennial ryegrass.
31b. Timothy.
31b. Cocksfoot (optional),.
3lb. Broad red clover.
31b. Montgomery red clover.
31b. M/S white clover (or PP of pedigree origin)

451b. per acre.

2. Dominant timothy (pedigree), broad red, merg-, ing later to dominant timothy-white clover should be confined meanwhile to fertile and low-lying land.

10lb. Timothy.
10lb. Italian ryegrass.
51b. Short-rotation ryegrass.
4lb. Broad red clover.
31b. M/S white clover or PP of pedigree origin.

321b. per acre.

For a while in the change-over little if any gen-

eral-purpose pasture will be sown, but once the special-purpose pasture has caught up to requirements then more of the general grassland of the farm may need to be renewed as such.

My recommendation for the constitution of the general-purpose 6 to 8 year pasture is somewhat as follows :—

10lb. Short-rotation ryegrass.
15lb. Perennial ryegrass.
5lb. Cocksfoot.
3lb. Timothy.
2lb. Crested dogstail.
3lb. M/S white clover.
1½lb. Montgomery red clover.
1½lb. Broad red clover.

41lb. per acre.

FERTILISERS

It is a matter of extreme importance to recognise that high-producing pasture swards cannot thrive on a low plane of nutrition. They cannot thrive under waterlogged and wet feet conditions; they cannot thrive within a soil that is too acid. Drainage must take care of the wet feet position; lime must be applied to reduce soil acidity to a point where clovers will thrive, but it is inadvisable to go beyond that point in the use of lime. A fairly safe measure would be a pH of 5.5 to 6.

For Southland, I would say that nitrogen is the main limiting factor to growth. As a matter of fact I am coming to the conclusion that our next big advance in grassland production all over New Zealand will be based on a compounded fertiliser containing some nitrogen. A good deal of research is necessary regarding the form of nitrogen to use and its compatibility in a compounded fertiliser with the other constituents of the mixture to maintain a stable compound and a free-running condition in the bags.

At this stage I do not want farmers to embark on a wild rush for nitrogen, nor to use it indiscriminately about the farm. Twenty-five years ago a flare for nitrogen broke out, largely on the advocacy of I.C.I., and I feel that the indiscriminate use of nitrogen on any kind of pasture sward and on any type of soil did the cause of nitrogen in New Zealand incalculable harm. The use and advocacy of nitrogen in the sulphate of ammonia form did not help the position, par-

ticularly in the absence of pre-liming to safeguard against undue acidification of the land.

Today we have at hand or in the offing less toxic and non-soil-acidifying forms of nitrogen and some forms that are showing a high compatibility relationship with the clovers of the sward. The development of these by commercial chemical fertiliser firms I regard as imperative to the wider, fuller, and more effective use of nitrogen in farming, whether it be in the production of grass fodder crops, grain crops, vegetable, or any other crop responsive to nitrogen.

Not only are these more compatible nitrogenous fertilisers in sight-I mention nitro-chalk and urea specifically-but also we have today more suitable and more responsive pasture plants than we had in 1925.

In any campaign for nitrogenous fertilisers we must ever be mindful of the complementary mineral fertilisers that are required to provide for and balance up the greater drain on the soil that higher yields and better crops exert. In the case of the in situ, grazed pasture this is not so significant owing to the turn round of fertility that the grazing animal accords. Nonetheless where there is continual high milk production, high fat lamb production, and high wool production, the pitrogen and mineral outgo is considerable and the balanced return of this nitrogen and minerals must be taken into consideration. This serves to strengthen rather the case of a more balanced compounded fertiliser mixture than we are using at the present time. I would, however, stress in advocating some artificial nitrogen, that clover nitrogen is and always will be the cheapest form of nitrogen and we just cannot over-evaluate the importance of a good clover content ; and any fertiliser and grazing management treatment must build and sustain a healthy clover companionship in the sward.

GRAZING MANAGEMENT

The first essential in grazing management is to utilise the maximum amount of grass by in situ grazing at its highest nutritive value.

The real art in grassland farming is so to constitute all pastures on the farm and so to graze-manage them as to ensure the widest possible spread of growth at a high nutritive value. If we persist in one general pasture mixture, and particularly when that pasture ages, we narrow down spread of production. If we persist in low-nutritive-value grasses, or with low

palatibility plants, or with low soil fertility that toughens growth, then high nutritive value can only be secured by hard, close grazing in order to keep what growth there is reasonably young, reasonably palatable, and reasonably nutritious. This is true of dominant perennial ryegrass-white clover swards ; it is true of dominant browntop-Yorkshire fog—sweet vernal-danthonia swards. Graziers of these must graze hard and must utilise these fully if milk production and growth in young stock are the objective.

Fat-lamb unthrift is worrying many farmers in Southland where there has been an upgrading of pasture quantity and quality by liming and fertilising. As I understand it there was a lift in fat lamb production and quality in the initial stages of pasture improvement, and as carrying capacity increased fattening quality in the lambs fell away. That problem is not confined to Southland; it is general on all lamb-fattening country in the north where full utilisation of all feed produced from high-producing grassland is attempted by the use of sheep alone.

On the normal type of permanent or long-rotation grassland, farmers in the north would consider 5 to 6 ewes to the acre the maximum number **for optimum thrift in individual lambs.** The **excess** feed over **and** above that required for the 5 or 6 ewes and their lambs, is consumed by cattle, and there is a very strong school that asserts that prime quality fat lamb production on high-producing pastures is not possible without cattle.

Whether the problem is one of asking the growing lamb to eat among sheep-fouled feed, or whether it is a matter of higher parasitic worm infestation in the growing lamb, I do not know. Perhaps both are contributory and complementary, for lambs-and mature sheep for that matter-will consume less dirty feed than they will clean feed, and on that score of lesser intake of food, parasitic worm infestation and the effect of these on the nutritional system may become accentuated. Dirty feed and insufficient feed towards the latter end of the fattening may contribute to this fat lamb unthrift in Southland.

Sears of my staff is of the opinion that a greater carrying capacity of ewes and lambs can be maintained on longer and more palatable feed, under rotational grazing, **provided always that the longer feed is really of high palatibility and is of high nutritive value.**

We feel it is not possible to spell dominant perennial ryegrass pastures, or ones in which there is blended a good deal of browntop, sweet vernal, and **Yorkshire** fog, and maintain a high palatability and a high nutritive value in the sward; but we do maintain that pastures dominated by short-rotation ryegrass, timothy, white clover, and broad red clover may be rotationally grazed without loss of palatability and nutritive value, and the spell between one grazing and another does tend to clean up dirt from the foliage and must tend to reduce the intake of parasitic larvae.

Such a concept does not imply daily shifts of ewes and lambs, but it does imply periodic shifts to clean the pasture. I am of the opinion that overmuch shifting of lambs is a mistake.

I think as the general-purpose pastures improve, it is a question of more cattle in Southland, or we may be able to offer the alternative to this in more special-purpose pastures designed to give more palatable food for the ewe and its lamb.

Pre-natal care of the ewe flock may also be significant in subsequent lamb thrift, and here again I am confident these special-purpose pastures adequately fertilised with a compounded fertiliser containing some nitrogen will provide that supplement additional to the turnip for the adequate feeding of the ewe flock prior to lambing in the spring.

As we step up the clovers in the, sward, and the varieties of those clovers, in the same or different pastures of the farm, and as we use more palatable species, such as short-rotation ryegrass, Italian ryegrass, timothy, and possibly meadow fescue, and distribute these in compatible combinations in the same paddock or spread them in more simple pastures paddock by paddock over the farm, nutritive value cum greater production cum longer seasonal spread of that production can be secured, because the need to graze close to maintain nutritive value is not so pressing. In other words, rotate grazing as against set grazing is possible, and in rotate grazing it is possible not only to produce more but to get more out of more species, and to spread that production over more months of the year.

The question is how does all this affect Southland? On your more fertile soils I am of the opinion that it is a case of changing over as rapidly as possible to the special-purpose pasture type until such time as approximately half the farm is sown to and managed for the best utilisation and growth of these pastures.

In their establishment, if there is any hanging back in growth, any stuntedness or yellowing, then I would recommend nitrogen as well as phosphate and maybe potash. For early autumn growth, and to push this further into the winter, and to lift the early spring growth from these pastures, again I would recommend a more complete fertiliser containing some nitrogen, particularly a basic form of nitrogen such as nitro-chalk. At Grasslands the form of nitrogen most compatible with clover is urea, but a case, has yet to be made out for this form of nitrogen in New Zealand before manufacturers will turn their attention to producing it in sufficient quantities to be worthwhile.

I would not advise giving up the winter root or winter forage crop in Southland. These fill the winter gap and provide the break-up for the follow-on special-purpose pasture.

The second and third grade lands of Southland may not be so straight-forward. These for the most part were originally in Danthonia tussock, and when broken up they rapidly revert to browntop in often a poor, unthrifty condition of growth. The soil itself is often too soggy and over-acid for good clover development, and hence for good nitrification per medium of these clovers. The soggy wetness must be overcome by drainage and the over-acidity must be reduced by liming. On this question of liming I just cannot understand the overall need of so much lime in Southland. For high pasture production and even for clover thrift, it is not necessary to raise the pH status of the soil above pH 5.5 to pH 6. Just how much lime that will require will depend on the original pH of the soil type and upon how fast applied lime leaches in Southland. From the point of view of a balanced pasture diet in terms of a high-producing pasture, say a 6 to 8 ewe carrying capacity plus some cattle, for every 3cwt. of carbonate of lime the sward utilises it utilises the phosphate in 7cwt. of superphosphate, the potash in 16cwt. of 30 per cent. potash salts, and the nitrogen in 24cwt. of sulphate of ammonia, or their equivalents. If we graze that sward and if the waste animal products-dung and urine-are uniformly returned to the sward, then as much lime in proportion to the other manurial elements goes back on to the grazed sward. The measured figures of fertilisers contained in the dung

and urine and returned to the land from a high-producing pasture are :—

268lb of carbonate of lime, 683lb of superphosphate, 1.867% of 30 per cent. potash salts, and 2,739lb of sulphate of ammonia equivalents.

From the foregoing it is quite obvious that the average to good pasture sward in Southland just cannot utilise the enormous quantities of lime that are periodically applied to the land, and either most of this lime is wasted or else there is a mysterious chemical reaction going on in the soil that either leads to leaching, locking up, or volatilisation of the lime that is applied. I know I am treading on dangerous and controversial ground in questioning this high per acre liming as a continuous process in Southland, but the reason and need of it are beyond my ken. I would suggest that if when you bring the pH of the soil to 5.5 to 6 there is no response from superphosphate, the complete manure or a mixture containing some nitrogen be tried.

For the breaking in of new country, particularly out of tussock or stunted browntop, the objective should be a general-purpose pasture rather than special-purpose in this early stage. Here it really is a question of soil drainage, soil amelioration, and lowering of acidity by liming, together with sufficient phosphate in the first twelve months to ensure good clover growth. In the early establishment of that clover and of the pasture as a whole the addition of nitrogen to the phosphate may be well worth while to ensure sufficient growth for early and high stock-carrying capacity.

The type of general-purpose pasture for these more difficult soil types will follow closely upon the lines as given for general-purpose pastures earlier in this paper.

The final point that I want to make, however, is the futility of the high-grade seed mixture without adequate provision for its sustenance and without some care in its grazing management. Once the tussock has rotted and in the second plough and turn over of the farm special-purpose pastures following the root crop are recommended over part of the farm.

The present time, with prices where they are for meat and wool particularly, is a time for major development even by the private enterpriser. The leading thought in that development is to spare or withhold none of the aids that are essential to suc-

cess. In some cases financial assistance will be necessary either on a long-term loan or on a subsidised basis. I have a hunch that the farming community as a whole should be behind the development of its great primary industry, and I also have a hunch that development must start within localised regions where there is sufficient enthusiasm to pool local talents and local knowledge and for those regions to plan for a regional development rather than for a few individuals to stand out as lone beacons in what could become a general conflagration.

Local advisory agricultural committees preferably within the Federated Farmers and in conjunction with the Department of Agriculture may be the impetus and guiding hand for such development.