RYEGRASS I N SOUTHLAND.

W. R. HARRIS

FERTILISERS (SOUTH ISLAND, N.Z.) LTD., INVERCARGILL.

Ryegrass is the predominant species in seed mixtures on the sown grasslands of Southland. The area is one of the largest tracts of naturally uniform good land in New Zealand. It includes a wide area of level plains, chiefly in the Western and Northern Districts, with rolling ridges largely confined to the Eastern Districts. The greater part of it is a heavy clayey loam, resting upon clay subsoil, which requires draining. The Northern Districts contain a fairly high proportion of lighter loam and shingly soil.

The total area of sown grasslands is 1,126,430 acres. Where a high standard of fertility is maintained on these lands, rye-grass remains the dominant type of pasture plant for many years, and wi th white clover forms the base of the swards. O n topdressed and well sweetened lands, sown out wi th short lived. pseudo strains , the ryegrass commences to die out, after the first or second years, and is usually replaced by a variable mixture' Of clover, timothy, cocksfoot, and crested dogstail, brown top, and other spec i es of volunteer plants . Where little or no top-dressing or liming has been done, the ryegrass rapidly gives way to dogstail, brown top, and weeds, which are unpalatable, and have a very low productive capacity. For a considerable period., and until four or five years ago, the production of ryegrass seed was extensive , and. the Province had probably the largest trade in the Dominion, Thi s provided a valuable addition to farm incomes, and was a profitable source of revenue to Merchant Firms. Following the advent of certified ryegrass , and general rec ogni ti on of its superior qualities in New Zealand and other countries, production and trade in ordinary ryegrass seed has fallen to a very low level,

En the coastal Districts, and in wet seasons throughout the whole Of the Southland Province, certified ryegrass seed has been of lower germination than that of the Northern, drier areas of New Zealand, and it has been lower than that of the ordinary type of Sou thland . Also , in some cases, certified ryegrass has proved unpala tab le, in comparison with local types. Further , the loss of a large portion of the ryegrass seed trade has reduced the business of a number of Merchant Firms as well as the income of Farmers from this source, Farmers, however, are not much concerned with loss of income from this direction, as increased returns from fat lambs , meat and butterfat have proved a much more profitable business* Nevertheless , the ryegrass question (Certified versus Southland types) has been until recently the most controversial one in the Province. Many farmers consider that their best types of Southland ryegrass are in no way inferior to North Island strains,

On a number. of farms there are paddocks predominant in ryegrass, that have been down in pasture for 12, 15, and 20 years, and in one case, just on 40 years. On one farm near Drummond , a well-known farmer has recently ploughed up his area of Certified ryegrass , which had been put down for trial purposes agai ns t hi s own strain of seed from pastures that have been down on his farm for over 20 years, His seed has proved more palatable and has been generally more satisfactory than the Northern Certified strains. There are several similar cases, and there is no doubt that the permarient strains of Southland rye are indeed

most satisfactory. In fac t the claims of Southland Farmers have been so insistent regarding the meri ta of their good strains that the Farmers' Union has contributed towards the aost of an extensive and long 'trial of the best Southland strains versus that of Hawke's Bay s trains . This trial is now being conducted on the Winton Experimental Farm by the Department of Agriculture , and is not actually one of certified v. uncertified,, but a blend of the best Southern strains in comparison with a blend of the best Hawke's Bay strains . There is a vast difference between the best types of permanent Southland strains and the ordinary Southland seed, which is not satisfactory for permanent pastures.

The aubject'matter of this Paper is based upon continuous field observations during the past five years. All general references to the performance and treatment of ryegrass are from the standpoint of it being the predominant species in the swards. I only know of one- case where a straight syegrass white clover seeding has been sown for grazing purposes. There are, however, a number of men who have made straight sowings of certified ryegrasa wi thout clover for seed production. When used later for grazing these straight sowings have generally proved unpalatable , and have remained ao until draining, adequate liming, and topdressing have produced a strong thick growth of white clover,

The present position of ryegrasa in Southland is that practically every progressive farmer is convinced that a true type of perennial is the most profitable and productive base in permanent pasture whether it be certified Southland or certified Hawke's Bay. There are, however, several main and vi tal points that a large ***number*** of farmers desire information upon.

(1) The correct methods of feeding and treating the soil so that 1 t may produce ryegrass in its most palatable and nutritious form.

(2) How to fully utilize and control the growth in order to fatten 90 to 100% of lambs off mothers,

(3) What method, if any, should be evolved to secure higher germination of seed of certified strains of ryegrass in the coastal Districts, particularly in wet seasons'?

The Department would do valuable work for the Province if it could answer these questions satisfactorily.

The solution of problems (1) and (2), *and* general adoption of the principles involved could possibly treble the producfion of fat lambs off mothers; both sheep and dairy pastures would benefit and a much greater return from our ryegrass base pastures could be ensured. My observations show that no hard and fast methods of grazing and treating ryegrass base pastures can be uniformly followed with successful results in all cases.

There is one point of great interest, however, in this c onnec ti on . In Southland there appears to be one uniform basic soil condition in practically every case where palatability and nutrition are really good irrespective of the type of soil and its carrying capaci ty . This condition is found on sheep. pastures on which 90 to 100% of the TOTAL lambs fatten off the mothers.

I refer to the P.H. value of the soil. I have carried Out a great deal of work on many hundreds of farms in Southland, and I have found that where the best results have been obtained the P.H. value of the soil has approximated the neutral condition.

On a number of paddocks where a reaction of P.H.5.5. has been found, not more 70% of the lambs have fattened, whereas in each instance of a P.H.6.0. reading, the maximum percentage invariably fattened *on* the mothers. *On* topdressed ryegraas base

pastures on soils deficient in lime, and consequently in an acid condition, and 'therefore of a low P.H. value, I have invariably found a lack of fattening properties, also a tendency for stock troubles to be more in evidence than on soils closely approaching the neutral condi tion.

Where practically all lambs are fattened on mothers, farmers invariably report a minimum of. stock troubles, This I have found to b.e the case both on light land carrying two ewes and on heavy land carrying four to seven ewes to the acre.

While on this point, there is another very interesting point arising from this , and this is in connection with the fattening of lambs off the mothers on new perennial rye pastures. Few farmers , *if* any , have had the results that the Bowmar Bros. achieved this year in' this connection. Messrs. Bowmar Bros. at Charlton near Gore brought in an area of some 65 acres of poor type brown top country adjoining their home farm= This land was in a very acid condition and after ploughing, 2½ tons of carbonate of lime per acre was applied, and turnips were sown. When sowing down to grass, a further ton of carbonate was applied, making an application in all of 3½ tons of carbonate o'f lime to the acre in the first eighteen months, Reverted Super and Superphosphate was also applied in liberal quantities; The seed mixture sown was :-

Certified Perennial Ryegrass	30 lbs	per acre
Italian	5 "	" "
Cer tified Cocksfoot	10 "	" "
Dogstail	2 "	" "
White Clover	2 "	" "
Montgomery Red Clover	2 "	" "
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The P.H. came up from approximately 4.3 to 6.3. I l l the first season's grazing of this pasture, 90% of the total lambs fattened on the mo thess , and the carrying capacity was five ewes to the acre. On the home farm nearby, it took some 20 years of spasmodic liming to build up to the neutral state.

There are many strains and types of ryegrass grown in Southland, and these under uniform treatment vary greatly in psoduc tive capaci ty . A number of typical cases are as follows:

The most outstanding case of high production of fat lambs, that has come under my notice occurred in the Centre Bush District, The field of 18½ acres was sown in November, 1935, with 5 lbs mother seed ryegrass, 20 lbs permanent pasture ryegrass, 5 lbs cocksfoot, 3¾ timothy , 2 lbs white clover and 1 cwt. Super to the acre. The following Spring the field was stocked with 65 ewes all with twin lambs and later on 9 ewes with single lambs were added - these were culls from other fields. All lambs with the exception of 4 fattened on the mothers, making a total return off mothers of 7½ fat lambs per acre. This was the Owner's first experience with certified ryegrass. On this farm for the past six years , all pastures have been annually topdressed with 1 cwt. super and 4 cwt. Carbonate of Lime to the acre. Pras tically all lambs on the farm fatten on the mothers each year, but so far no other field has approached the unusually high production of 7-h fat lambs to the acre. The certified field together with several others adjoining have been well limed and are closely approaching the neutral condition.

A well-known farmer in the Thornbury District has sown down four paddocks with certified seed as a base and some *eight* with ordinary ryegrass. Palatabili ty and fattening properties have been equally good on both types. A high standard of' fertility has been built up and maintained by annual topdressings, liming

and draining, During the past season from a total of 1800 lambs a first draft of 1252 fattened on the mothers,

A farmer *in* the Waimatuku District on good heavy land several years ago sowed out Southland grown 1st harvest seed against a line of ordinary ryegrass seed recommended as old Southland. The latter practically ran out after the-first year, and was surface sown with certified seed. Three fields have *now* been sown down with certified ryegrass seed as a base. Also, on this farm there is one 17 year old paddock which had been sown down with what proved to be a persistent strain of 'Southland seed, and ryegrass is still predominant in the sward. Experience has shown that this latter type of seed cannot be procured with any degree 'of certainty. Therefore, the farmer has abandoned the use of ordinary type seed in favour of that of certified 'strains, Annual topdressing has been practised on this farm for some years past, and it has been well drained and limed. As a consequence, practically all lambs produced have fattened on the mothers for some years.

On good land near Tuatapere a 25 acre field was sown down in November, 1933, with 3 0 lbs.of ryegrass and 3 lbs of white clover as a base. Rape and turnip seed was included and 2½ cwt. of mixed turnip fertiliser was used to the acre. On 15 acres certified permanent pasture seed was used, and 10 acres received ordinary Southland, The latter at the end of 12 months had deteriorated to such an extent that surface sowing with certified seed mas resorted to, In the first year grazing results were unsatisfactory over the whole area and continued so during the second year, although Autumn topdressed with 1½ cwt. Basic Slag, 1½ cwt. Blood and Bone, ¾ cwt. 30% Potash Salts, and 2 cwt. of Carbonate of Lime to the acre. In the third year an Autumn top-dressing of 1¾ cwt. Super and 27 cwt. Carbonate of Lime to the acre was made, and complete satisfaction regarding palatability and nutrition followed. En the Spring of 1936 the paddock was stock-ed with 125 ewes (5 to the acre) which produced' 185 lambs; by mid February, with the exception of 19, all lambs had fattened on the mothers. A further noteworthy incident occurred in May 1937. Following a short spell, a mob of stud lambs and 15 horses were turned in and the whole of the stock remained exclus-ively on the 15 acres of certified ryegrass for the first ten days.

En the Drummond District on good heavy land an investigation of a complaint of unpalatability and poor growth in a first year certified permanent pasture resulted as follows: The 26 year acre paddock was sown in March, 1934, with 30 lbs of certified permanent pasture seed, grown on the Owner's farm. 7 lbs Cocksfoot, 4 lbs timothy, 2 lbs crested dogstail and 3 lbs white clover to the acre was also included, and 1 ton of Carbonate of Lime, 1¾ cwt. Super, 1½ cwt. Seychelles to the acre was used, It received a further topdressing of 2 cwt. Super to the acre in the Spring. In August, 1935, 1 cwto of sulphate of ammonia was applied. This proved to be the turning point and the response was almost immediate and sustained throughout the season. The field was stocked with 139 ewes with single lambs and they remain-ed on it until drafting time. The first draft was sent to the Works before Christmas and the second early in January. Only nine lambs failed to fatten off mothers, and the killing weight of the 130 fat lambs averaged 36.5 lbs. The season had been an exceptionally dry one, but despite this, following the removal of the lambs and most of the ewes the recovery of the pasture was most remarkable, and in mid February the sward was an almost perfect mat of green grass and clover some two inches in length. It was apparent that the dressing of sulphate of ammonia had had a marked effect in developing the thick mat of white clover.

Another complaint of continued unpalatability and poor growth in a three year old Hawke's Bay ryegrass came from West

Plains. This had been. sown out alongside an area of ordinary poor type Southland, for which the dairy cows showed preference although the ryegrass had very largely given way to ragwort, Yorkshire fog and weeds. An Autumn topdressing was then given to the Hawke's Bay grass, consisting of 1 ton of Carbonate of Lime, 2 cwt. Super and 1 cwt. of sulphate of ammonia. In the Spring the whole paddock was closed up. for some six weeks. The Hawke's Bay area made a strong growth of about 12 inches and this practically smothered #he ragwort.. The area sown with Southland seed made a weak growth of about six inches with weeds and ragwort predominant. At this stage the field was grazed by dairy cows and despite the fac t that the Hawke's Bay grass was prac tically in the "shot blade" the stock showed a preference for it. Thi s occurred four years ago, and no further fertiliser has been applied to the Hawke's Bay area which is still satisfactory. The area sown with the poor type ordinary Southland ryegrass failed completely and has since been ploughed up.

An illustration of the germination problem with certified seed has occurred on a farm at Balfour. The farmer sowed out a paddock of ryegrass using his own Southland strain with the exception of about two acres in the middle of the paddock which was sown with certified mother seed. At harvest time the seed was treated separately- On being tested for germination, the Southland strain showed a test of 86% and the mother seed only 26%. Both portions of the paddock received the same treatment manurial and otherwise,

Near Riversdale, another outstanding case of highly successful production from certified 1st harvest ryegrass base pasture has occurred. The soil was of medium type that had been in an exceedingly low state of fertili ty and had been more or less abandoned for some years prior to the present owner taking over 3 years ago, The area of the farm is 228 acres. Two and a half years ago 160 acres 'of this couch and brown top country was sown down with 25 lbs certified at Harvest ryegrass. Seven pounds cocksfoot and 2 lbs of white clover together with 1 ton of carbonate of lime and 2½ cwt. Super to the acre were also sown. Palatability and clover growth were poor in the first season. A further dressing of 1 ton of carbonate of lime and 2 cwt. Super to the acre was then made at the commencement of the *second* year. This area (2 fields of 80 acres each) was then stocked in the Spring of 1936 with 600 ewes which produced 550 lambs all by Romney Rams. All of these with the exception of five. or six fattened on the mothers, and the killing weight of the wether lambs averaged 42 .lbs per. head, The white clover made strong growth in the second season. Topping with a mowing machine to prevent seeding was carried out on two occasions, the first in November and the second in February.

A further interesting feature was the fact that the remaining 66 acres was a first year pasture very deficient in clover and most unpalatable. It has received another ton of corbona te of lime and 2 cwt. of Super as an Autumn topdressing. A good performance is looked for this season following the excellent results from similar treatment on the 160 acres.

The use of Potash Salts as a remedy for many cases of unpalatability in ryegsass base pastures requires special mention. The chief characteristics of potash responsive soils and pastures are usually f ound on well limed soils that have received consistent or heavy dressings of phosphate and where fattening properties are still short of the maximum. These conditions are usually found on heavy or peaty soils resting upon clay subsoils and these types of land generally have a Summer carrying aapaoity of from 5 to 8 ewes per acre. A strong thick growth of white clover is generally found and in some cases scouring is in evidence.

I can give (but unfortunately time will not permit) many instances of certified rye pastures that have received most generous treatment with phosphate and lime but have failed to produce satisfactory results until potash had been applied.. Following the application of 30% potash salts the fattening properties of the pastures showed a most marked improvement, and the improvement in the health of the sheep could be seen in the wonderful bloom that became apparent in the wool.

Management and grazing control of ryegrass pastures and particularly those of certified strains is of special importance. It has been proved that faulty control despite adequate liming and a high state of fertility can reduce the performance and production of ryegrass pastures to a most unsatisfactory standard. The main feature in successful Summer control is to prevent the formation of seed heads. Cattle can do this effectively provided they' are placed upon sheep paddocks when the first flush growth commences. Stocking with a mob of cattle at later periods is usually not as effective and a number of farmers have made this -mistake, Where sufficient cattle are not available the use of a mowing machine for topping just as the grass is running into "shot blade" is sound practice. Unfortunately this work is seldom attended to until the seed heads are well formed in late December and January . To be thoroughly effective "topping" usually requires to be done between mid November and mid December. At this period farmers find themselves too busy with the preparation of land for crops to give the required attention to pasture control,

The closing of ryegrass pas-tures in rotation for a period Of a few weeks during the months of March and April is not yet generally prac tised. Those who have done so in conjunction with Autumn topdressing find that the grass comes away at least two weeks earlier in the Spring. In all cases of full utilization one finds that ryegrass pastures are lightly stocked in the Winter and early Spring, kept fairly closely grazed during early Summer and topdressed and spelled for a few weeks in the Autumn. *On Sir* William Hunt's farm at Te Tipua some 3,000 acres of certified ryegrass base pastures have been managed along 'these lines with outstanding success.

My paper deals w ith ryegrass strains in Southland and I have attempted to show that the whole success arising from the use of the better types of certified strains is dependent firstly on the chemical condition of the soil, and secondly on the maintenance and building up of fertility through correct manuring. The whole criticism that has been levelled at' certified ryegrass in past years and particularly in the matter, of palatability can be attributed to the factors mentioned, i.e. faults in the chemical condition of the soil and its fertility along with incorrect management .

DISCUSSION ON TWO PRECEDING PAPERS.

Mr. J. W. Calder, Lincoln:

The most striking feature resulting from these two papers is that in Otago and Southland the strains of ryegrass behave in a very similar manner to those in other parts of N.Z.

Palatability was the first outcry against the certified ryegrass referred to, and you will all agree that the question was warranted, because the grasses were sown down under soil conditions and management conditions that were looked upon as ideal. It has been pointed out that the unpalatability of the ryegrass is more noticeable after its first and second year. It is still to some extent prevalent, and the only way in which it can be overcome is by sowing your grass mixture on a fallowed seed bed with covers to give the clover an opportunity to develop from the very first. If you sow ryegrass and clover together, t-he ryegrass will suppress the clover and you will not get the clover until the second year, or until eighteen months - whereas under ideal conditions you can eow your grass and clover on fallowed seed bed during December/ January and get vigorous and nutritious ryegrass in your first year.

That experience has been brought home to the Canterbury farmers who have sown ryegrass on cereal after cereal. These. have left the ground dry, and the establishment of clover and ryegrass on such fields has been very poor, and unpalatability has been most noticeable.

Another point that is particularly important as far as the strains of ryegrass are concerned is persistency. Without persistency in the ryegrass you would not'be able to manage your pastures - topdressing would be reduced in its benefits, and there would be nothing to give you your return of your money if permanency were not there.

We have yet to consider what effect the sweetening up of the soil will have on the growth of the grass at such time of the year as the grass grub is about, In Canterbury we have experienced some very good pastures sown down under ideal conditions and got away in November, but the next year they were ruined by the grass grub. This is a problem that must be tackled very soon. It may be that when we get these permanent postures down, our only chance of renewing them will be after the grass grub has eaten them out.

One other matter. Apparently here there is a particular complaint against the germination of the permanent strain. To what extent that can be remedied is, of course, a question for the *future*.

Mr. Hurst, North Otago:

It seems a wise move to leave the land lying idle till December/January. I have been giving. it a light covering, sowing it down in the autumn with grass, but I am not in a position to say whether the clovers will stand up to the winter.

The grass crop in North Otago was very good this year - whether Italian or Hawkes Bay. I. have, however, been irrigating portion of my land, and the part which was not irrigated was cleaned out *by* the grub.

Mr. Calder, Lincoln:

The alternative is to son rather late in the autumn, but then the rape crop is a fallow crop, nnd the strike you get after

rape is not very good. The drawback to sowing fairly late in the autumn is that the clovers, especially when sown in competition with vigorous ryegrass, in their earlier stages are suppressed and are then subject to frost.

Mr. E. Madden, Palmerston North:

Ryegrass conditions in the South are much the same as in the North, It is a matter of making the ground sufficiently fertile to grow the grass in a good vigorous manner. If the soil is not built up in fertility at the time the seed is put in, the clover will be slow to start. If super or lime is sown with the seed, the clover will be established early. That makes for a better nitrogenous condition of the soil the following year, and there will be more palatability in the ryegrass and more fertility to maintain the clover,

Mr, Smith, Dunedin:

When the original seed in Southland came from Hawlres Bay there was no palatability trouble, but since the name "Certified" was attached to that rye the point of palatibility was raised. When the old pastures were sown down 50 or 60 years ago with Poverty Bay and Hawkes Bay rye, there was no trouble. If germination trouble of the seed had not come along, very little would be heard about it.