RYEGRASS STRAINS IN OTAGO AND SOUTHLAND.

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INTRODUCTION.

The Place of Perennial Ryeprass in Otago and Southland:

Before considering the various strains of perennial ryegrass, the place of this grass in Otago and Southland should be considered, Generallyspeaking, the farmer's air! is to establish and maintain permanent pastures. The definition of a permanent pastureis, ofnecessity, veryvariable, and depends to a great extent on factors such as soil fertility and system of farming, The most appropriate and usual definition is that it should stay down as long as possible. It is, of course, realised that a number of farmers require temporary pastures but the chief object of this pager is to discuss the types of ryegrass in relation to the permanent pastures of Otago and Southland. At the last Conference the questi*on* of seed nixtures was discussed freely as the result of papers read by Levy and Smith, and it wasgenerally agreed that ryegrass should form the basis of the Majority of seed nixtures in NewZealand. In Otago and Southland the usual practice is to sow perennial ryegrass in the nixtures at the rate of about 1½ bushels per acre on all but the poorest country.

The following figures show the acreage sown down during each of the last six years to Grasses, Clovers and Lucerne in Otago andSouthland. The annual production of perennial ryegrass seed for these districts is also shown:

SEASON.	ACRESSOWN.	BUSHELS OF SEED PRODUCED.
1930/31.	124,000	340,000
1931/32.	**131,000**	158,000
1932/33.	120,000	398,000
1933/34	**160,000**	319,000
1934/35.	**149,000**	318,000
1935/36.	**147,000**	369,000.

Although these figures include lucerne and clovers and temporary pasture, it is considered that at least 75% of the total will be sown down in permanent pasture mixtures. With an average of 105,000 acres to be sown down each year and with mixtures including perennial ryegrass at 1½ bushels per acre the average total ryegrass seed requirement would be in thevicinity of 157,500 bushels per annum. The annual production of perennial ryegrass seed in Otago and Southland over the same period averages some 317,000 bushels, which shows that these districts are not only capable of supplying themselves with current requirenents, but also have an annual surplus which is valued at approximately £26,000.

The foregoing has been pointed out in order to show that ryegrass is of considerable importance in Otago and Southland to the grazier, seed producer, and merchant.

TYPES OF RYEGRASS.

Research work in New Zealand and overseas has shown that there arc a number of fairly well defined types of perennial ryegrass on the world's markets. So far as Otago and. Southland are concerned three of these types warrant consideration. These types have been classified as follows:

1. TRUE PERENNIAL TYPE: Dark. green, leafy, persistent and rapid in recovery after grazing. In this group are the yresent certified and British Indigenous strains.

2. GOOD FALSE PERENNIAL TYPE: Rather' greyish green colour, fairly persi s tent,, but not as resistant to rust or as good in autumn growth a s the first group . This group contains the best of the Southland and Otago rye-grass.

3. AVERAGE BAD FALSE PERENNIAL TYPE: Rapid in establishment and' of a distinctive greyish green colour. Non-persistent. This group contains the bulk 'of the Southern ryegrass seed.

Before certification was inaugurated, 345 Otago and Southland samples of perennial ryegrass were submitted for trial, and were tested out with the following resultant analysis:

1.5% of the lines tested; were True,, Perennial Type;
8.5% " " " " " Good false perennial type;
90. 0% " " " " " Average and bad false perennial type.

EXPERIMENTAL PERFORMANCE AND FARMERS EXPERIENCE WITH THE VARIOUS TYPES OF RYEGRASS IN OTAGO AND SOUTHLAND.

The chief differences occurring in the strains of rye-grass are :

1. Persistency;
2. Palatability;
3. Production of herbage;
4. Carrying capacity and associated returns.

PERSISTENCY: Although one sometimes sees exceptions, the following table of the relative persistency of various types of ryegrass is typical of many results obtained from trials not only in Otago and Southland, but also throughout New Zealand:

PERSISTENCY OF TYi?ES (Certified = 10).

LOCATION AND AGE OF TRIAL.		CERTIFIED.	BEST SOUTHERN.	ORDINARY SOUTHERN.
Central Otago,	2½ years.	10	7	3
North Otago	1 year.	10	8	4
South Otago	2 years.	10	7	2
Southland	1½ years.	10	7	2
Southland.	5¾ years.	10	8.5	1.8 to 4.4.

The trials quoted represent a wide range of country and soil types and show a very uniform range of performance, and there is no doubt that under most conditions the ordinary Southern rye-grass is effectively dead two years, from the tine of sowing. The best Southern ryegrass is rather more variable than is shown in the table, but usually maintains a fairly:, good cover.. This is probably due to, the fact that this type contains a comparatively high percentage of plants which, although not perhaps as productive as the certified type , are about as persistent.

The British indigenous strain has not, as yet, been tried. out very extensively , but there are indications that, provided it has a fair start, it is at least as persistent as the certified type. It also appears that under most condatibns it will make a finer and denser sward.

The general opinion amongst farmers regarding ordinary southern ryegrass is that they can seldom expect a line of ordinary ryegrass to last for. more than two years and the length of time that the pastures stay down is determined, not so much by the rotation that they wish to follow, as by the rotation that they have to follow as the result of their pastures running out.

Regarding farmers experience with the best Southern ryegrass, it is difficult to obtain any information comparing the length of time that pastures are staying down when sown with this type, or the certified type, but it is known that there *are* pastures up to 20 years of age, and which are producing this strain of seed. Nevertheless the proportion of such pastures must be small as considerable difficulty was experienced last year in locating ten of them which could be shut up for seed production.

Summarised, the position regarding the persistency of the various types is that the Certified and British indigenous strains are unquestionably the most persistent types available and farmers using certified ryegrass are, with few exceptions, perfectly satisfied with it in this respect.

PALATABILITY: It is *around* this subject that most of the discussion regarding the various types of ryegrass has centred. Bcf ore discussing this question in relation to the types of ryegrass a few general observations may not be out of place. Palatability is a word which has been used to describe a difference which is noticeable as the result of *an* animal's apparent preference for one type of feed over another, and is therefore purely relative. To say that a certain feed or type of plant is palatable really means that it is acre attractive than another type of feed or plant, and does not necessarily mean that the latter will *not be* eaten or that stock *will* not thrive on it. To what extent the relative palatability of different feeds is an indication of their values is hard to say, but it is generally agreed that other things being equal the nore palatable feed is the best. In considering the value of different fodders the point of "other things being equal" is frequently absent, For example when soft turnips and swedes are sown in a mixture stock almost invariably "top" the swedes before eating any of the soft turnip tops. That this is not held against soft turnips is evidenced by the fact that in Otago and Southland some 85,000 acres are annually sown in soft turnips, much of the feed cf which is *in* the leaf. These 85,000 acres of soft turnips could not profitably be replaced by turnips as other conditions are not equal.

It is thought that much the same line of thought rust be adopted when considering the question -of palatabi lity in relation tc strains of ryegrass. Generally speaking relative palatabi lity is influenced by four major factors:

1. Species, variety or' strain;
2. Stage of growth;
3. Fertility;
4. Associated species.

(1) Field trials and- farmers' experiences throughout New Zealand have shown conclusively that in young pastures the certified type of ryegrass is less' attractive to stock than poorer types when they are both sown adjacent to one another. The following figures, indicating the relative amount of stalk left on plots sown with different types of ryegrass, are typical of the results obtained from nsny other trials. The trial quoted is at Palmerston, Otago, and had been down for 18 months at the time the notes were taken:

CERTIFIED.	BEST SOUTHERN.	ORDINARY SOUTHERN.	BRITISH INDIGENOUS.
10	8	0	4

It is interesting to note that the best southern is very similar to the certified as regards palatability,

(2) The effect of stage of growth on palatability is sometimes very marked. western Wolths which is regarded as being a very palatable feed has been seen to be neglected in favour of certified ryegrass in *a* trial at Owaka. The only cause was that while the certified ryegrass was in an ideal stage for grazing, the western wolths was well past the optimum stage and had consequently been neglected, Other similar instances have been seen where ordinary ryegrass has been *neglected,* while the certified has been eaten,

(3) and (4) The effect of fertility and associated species is probably the most important one in connection with the palatability of the' ryegrass strains. From trials and general experience of farmers it has been shown that palatability due to these factors may vary considerably . Instance8 have been seen where certified ryegrass has been sown pure on poorly drailed land and has produced practically no useful feed. Adjacent pastures containing lower fertility demanding and more water tolerant grasses such a8 creeping bent are producing more feed and carrying more stock, Under those conditions there are two alternatives. The first is to arrange for efficient drainage and topdressing *in* order to obtain a healthy ryegrass white clover sward. The second alternative is that if draining is not possible the ryegrass in the mixture should be substituted to a large extent by grasses such as timothy or foxtail, which thrive in these conditions. This appears to be the main point in pasture management. The pasture plants must thrive. If ryegrass wi 11 not- thrive and the conditions cannot be altered to make it thrive then it should be replaced by plants that will thrive under these conditions. Throughout Otago and Southland, however, most of the country can be brought to a state where ryegrass will thrive. This thriftiness can usually be brought about by the increase in nitrogen that is available to the plant. That this is recognised by farmers generally is shown by the increasing amount .of topdressing with lime and phosphate both of which encourage clovers in Otago and Southland to probably a greater extent than in any other district in New Zealand',

The trial at Palmerston, which has already been quoted, is an excellent example of this aspect. Up to 18 months fron sowing the certified ryegrass had been neglected in favour of the more palatable false perennial ryegrass which had been sown on the unmanured portion of the surrounding paddocks. At two years f rom sowing the position was changing until at the present time ($2\frac{3}{4}$ years from sowing) the former yosition is reversed, The trial which consists mainly of ryegrass, white clover and red clover, is more closely grazed than is the surrounding area, which consists of a little stunted ryegrass and cocksfoot, and a small quantity of clover. Sweet vernal is prominent, This change has undoubtedly been brought about by the nitrogen supplied by the clover, which in turn has responded to the lime and superphosphate which have been applied annually. There are certain districts in Otago where responses to phosphate are very slight owing to the prevailing dry conditions. Here the certified ryegrass does not thrive to the extent that it does in other districts, but the opinion has. been expressed by farmers that *even so* it is of great value to them when they have the choice of certified ryegrass and no ryegrass at all after a, year or so.

Certified ryegrass has been cri ticised on account of its stalkiness after a seed crop has been taken, This is most noticeable in the drier districts where the aftermath growth is poor. Generally speaking one would expect this condition, The pasture for three months or so has been managed with the sole obj ect of producing dry seed. stalks and it seems unreasonable that it should, immediately after cutting, be expected to produce succulent leafage. In districts where this is a problem, seed produc ti on *and* grazing should be divorced and seed production areas treated as such only.

Next to the question of palatability, that of the failure of the certified ryegrass to produce high germinating seed in wet seasons is the most discussed. On the whole this question is of greater importance than that of palatability. In some years the Province's production of perennial ryegrass seed has reached the three quarters of a million bushel mark. With regard to the export of ryegrass seed this is a fairly serious matter. Overseas buyers are not clamouring for our ordinary ryegrass seed. Only recently an American firm expressed its disappointment regarding it and stated that repeat orders would be unlikely if the type were not better. The same applies to the English market. New Zealand commercial ryegrass is regarded as being inferior to Irish or Scottish whilst the certified is considered to be at least as good as theirs. The only theory that enables the ordinary ryegrass seed to be exported is not its quality or type, but its high purity and germination and its low price. If the low germination trouble could be overcome there is no reason why certified ryegrass should not be produced almost as cheaply as the ordinary ryegrass. It has been stated by some people that certified ryegrass is a poor seed producer and that on this account seed cannot be produced cheaply. The following figures regarding yields do not bear this out.

YIELDS IN BUSHELS PER ACRE OF RYEGRASS SEED HARVESTED IN SOUTHLAND

	1932/33.	1933/34.	1934/35.	1935/36.	Average.
Certified	15.4	22.4	25.5	28.8	23.0.
Uncertified	24.0	22.3	20.7	25.6	23.2.

GRAZING TRIALS: As a means of evaluating different strains of pasture plants, this type of trial is doubtless the most satisfactory and two trials of this nature have been laid down in Southland with the object of comparing certified ryegrass with -

A. Ordinary Southland ryegrass; and
B. Best Southland ryegrass.

The following are the details of and the results that have been obtained from these trials to date.

CERTIFIED v. ORDINARY SOUTHLAND. This trial was laid down in October, 1933, and consists of two paddocks, each 2½ acres in area. One paddock was sown with a blend of five lines of Commercial Southland ryegrass, one of which was later found to be of a considerably better type than the average. The other paddock was sown with a line of Southland produced certified ryegrass. Both paddocks, were sown at the rate of 40 lbs. perennial ryegrass, plus 3 Pbs. ordinary white clover per acre,. Both paddocks have been fed off in the course of the ordinary farm rotation and, have been stocked according to the amount of feed on them.. Records have been kept of the number of cow days per acre that each paddock carried, The amount of butterfat produced has also been recorded.

Whilst this experiment may not be considered ideal as regards lay out, the difference in the amount of grazing that has been possible on each paddock is sufficient to justify the conclusion that it is due to the strain of ryegrass sown in each paddock. Each, paddock received 15 cwt. per acre of carbonate of lime in the autumn, after sowing, and two spring- dressings of superphosphate at 2 cwt. --per acre. The following are the details of the stock carried and the butterfat produced for the 3½ seasons that the trial has been in progress. No grazing has been carried out-in July in any year, so this month has been used to indicate the beginning and the end of each season,. In brackets are the values relative to certified at 100 units of, production.

Period.	CERTIFIED. cow days per ac.	Dry Stock days per ac.	Butter-fat per acre.	UNCERTIFIED. cow days per ac.	Dry Stock Days per ac.	Butter-fat per acre.
March - June, 1934.	315.88 (100)	-	283.52 (100)	50.2 (147)	-	47.24
August, 1934, to June, 1935.	222.66 (71)	12.8	205.27 (72)			
August, 1935, to June, 1936	372.07 (100)	11.5	284.64 (100)	213.64 (57)	9.8	181.05
August, 1936, to June, 1937.	345.52 (100)	-	320.35 (100)	193.8 (56)	8.0	183.21 (57)
TOTALS:	1068.12 (100)	21.1	905.13 (100	706.06 (66)	21.6	625.84. (69).

Very little comment is needed on these figures as the results are obvious. During the first autumn the uncertified was distinctly the best and carried about one and a half times as many stock. as did the certified, The following year the position was reversed, the uncertified carrying less than ¾ the number of stock that the certified did. The next two seasons show a steady falling off in carrying capacity of theuncertified the stock carried during the last season being only about half that of the certified, The butter fat production trend is very similar to the carrying capacity trend. A botanical analysis of each paddock was made last June. The certified paddock had been grazed two days previously, whereas the uncertified had not been grazed for 26 days. Nevertheless, as the amount of fresh growth on each paddock was very small the readings should be comparable.

BOTANICAL ANALYSIS 1/6/37.

CERTIFIED v. UNCERTIFIED GRAZING TRIAL, WINTON.

	Bare Ground.	Rye-Grass.	White Clover.	Other Grasses.	Weeds.
Certified,	23	49	23	29	0
Uncertified	22	19	38	27	12.

The certified paddock is for the most part a good ryegrass white clover pasture with a fair amount of Poa Annua and Poa trivialis throughout, as well as a little brown top and dogstail. The uncertified paddock is very mixed, the dominant species at the present time being white clover with a considerable mixture of grasses and weeds. Ryegrass is much less in evidence than in the certified paddocks. It is interesting to note that when the trial was inspected at the end of the first autumn "the growth on the certified paddock was better grazed than that on the uncertified, on which the growth was much ranker." At no stage has any difficulty been experienced with regard to the grazing of the certified paddock.

CERTIFIED v. BEST SOUTHLAND: Last October another grazing trial was laid down at the Winton Demonstration Farm with the object of finding out the relative values of the best Southland ryegrass and certified ryegrass. It has been claimed that the best Southland ryegrass is better than the certified, and this trial has been laid down by the Department of Agriculture with the co-operation and approval of the

Grain and Seed Committee of the Southland Provincial Executive of the Farmers' Union, The trial' consists of 8 paddocks, each 2½ acres in size, four of which were sown with a blend of 10 lines of the best Southland perennial ryegrass obtainable and the remaining four were sown with a blend of nine lines of certified mother seed perennial ryegrass. The ryegrass in each case was sown at 30 lbs. per acre, together with white clover at 3 lbs. per acre. A flock of 120 ewes was purchased and divided into two equal and similar flocks. One flock is to remain on the paddocks sown with the certified seed and the other is to remain on the paddocks sown with the Southland seed. Records of the following are to be kept regarding each series of paddocks:

(1) Total grazing;
(2) Weight of wool;
(3) Percentage of lambs off mothe-rs;
(4) Iamb weights and grades;
(5) Botanical analyses;
(6) Any other variations that may be seen from time to time.

Up to the present time the amount of grazing on each series. has been similar, but latest -reports (June) indicate that the "Southland" paddocks have opened up more than the certified. Point analyses carried out early in June bear this out, the results from one pair of paddocks being as follows:

	BARE GROUND.	RYEGRASS.
Certif i cd ...	32	71
Southland .,.	49	54.3.

CONCLUSIONS:

PERSISTENCY - It has been proved by farmers and trials that British Indigenous Ryegrass and certified ryegrass'are the most persistent types.

PALATABILITY - Differences in the palatability of the various strains are very marked, but no more so than in other parts of the Dominion. Certified ryegrass, on account of the shorter growing season in Otago and Southland needs more, careful management than it does in the North Islahd. This question of management applies to pastures generally and not only to certified ryegrass.

Although this type cf ryegrass has been sown in Otago and Southland for many years, the question of palatability has arisen only since certification started some eight years ago.

GENERAL: Certified ryegrass is being used with success by many farmers throughout Otago and Southland. The general. practice being adopted is sowing clovers in the mixture, liberal topdressing with lime and phosphate, grazing before herbage becomes too rank, and topping with a mower if necessary. Most complaints have been regarding pastures that are less than'two years old. This coincides with the fact that white clover takes as a rule some two years to become thoroughly established.

The general seeding of 1½ bushels per acre could with with advantage be reduced to a bushel or less in order that the clover may receive a better start,

British indigenous ryegrass has been favourably commented on by farmers and officers of the Department of Agriculture, and further investigation regarding its value in Otago and Southland would be of considerable interest.