

THE BEHAVIOUR OF NEW ZEALAND CERTIFIED
GRASSES IN NEW ZEALAND AND ABROAD,

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Since 1928 the Department has laid down a large number of trials of the various strains of grasses throughout the country. The following shows the number laid down in the four main districts:

Auckland	22 trials.
Wellington	35 trials.
Canterbury	21 trials.
Otago	24 trials.
Total:	102 trials.

These trials have been laid down on a wide range of Soil types and climatic conditions. In the North Island, trials have been laid down, on the gumlands of North Auckland, the pumice lands around Rotorua, the sheep country of Hawke's Bay, Poverty Bay, and Wairarapa, and the dairying lands of the Waikato, Taranaki, and Manawatu.

In the South they are equally well spread over a good range of country, Nelson, Marlborough, the West coast, Canterbury, North Otago, Central Otago, and Southland, all having trials in various parts.

Ryegrass and Cocksfoot have been the main grass species under trial and representative lines of most strains occurring in these species have been sown.

In none of the trials in New Zealand has any type of ryegrass proved superior or even equal to the certified type. The only type which has approached the New Zealand certified type is the British Indigenous, which, where competition is not severe, compares fairly favourably with the certified type. The main limiting factor to its usefulness is its lateness to start growth in the spring and its low total production. The only other type which has any claim to recognition is the good false or South Island perennial type. In all trials this type has proved to be consistently less persistent than the certified. In the first year or so the difference is small, in later years the South Island type thins out considerably, but, due to the small percentage of persistent types which it contains, does not die right out as do the bad false perennials.

In the spring of 1932 a yield trial of the various strains of ryegrass was laid down at the Experimental farm, Marton.

The following table shows the relative production of these strains when the trial was in its third year. All the plots were sown at 40 lbs. per acre and 3 lbs. per acre of Certified Mother seed white clover.

Table 1.

Showing relative seasonal yields of strains of ryegrass.

	Certified.	South Island perennial type.	British Indig- enous.	Bad false perennial.
Early spring	100	98	81	47
Late Spring	100	97	98	94
Summer	100	86	58	46
Autumn	100	95	78	63
Winter	100	85	67	40
Total for 1 year	100	96	82	72
Total of ryegrass only (determined by herbage anal- ysis) for 1 year.	100	84	58	14

From the above table it can be seen that at all times no strain produces more herbage than does the certified. It should be noted that white clover growth is strong on all plots and in the spring nullifies differences due to the ryegrass strain. The South Island perennial type at the time of ordinary vigorous growth is very little behind but fails during the summer and winter.

The British Indigenous, except during the spring when white clover is growing at its best, is well behind the certified.

The bad false perennial plot also produces very little except when the clover is vigorous.

Herbage analyses are made each time the plots are cut and the last line in the table shows very well the relative amounts of ryegrass produced during the year by each plot.

In the development of pumice country certified ryegrass has been one of the chief contributing factors in the establishment of good ryegrass-white clover pastures which have been down up to 5 years and which are now carrying well over $\frac{3}{4}$ of a cow per acre. As in other districts, perennial ryegrass is considered to be the most important grass in pumice country. Before the advent of certified ryegrass it was almost impossible to obtain the all-essential permanent cover of a high producing grass, but with certified ryegrass this has proved to be both possible and profitable.

In Canterbury certified ryegrass has spread widely and is now generally accepted. Grazing trials which have been carried out there with certified and uncertified ryegrass have, over a number of trials, shown an increase in carrying capacity of 31%. As both strains were sown with a general mixture including cocksfoot which soon replaced the uncertified ryegrass and maintained the carrying capacity, it is reasonable to suppose that if simple mixtures of ryegrass and white clover only had been sown the difference in favour of the certified would have been considerably greater. In some strain trials in the drier parts of the

Canterbury plains the certified ryegrass is now after 4½ years a dominant ryegrass sward whilst the average South Island perennial ryegrass is dominantly bare ground.

An experiment designed to compare the relative carrying capacity and butter fat production of certified and commercial strains of ryegrass was laid down at Winton, Southland, in November, 1933. The trial has been grazed almost entirely with dairy cows and the following figures show the relative carrying capacity of the two areas up to the end of May, 1935.

	<u>Certified ryegrass</u>	<u>Uncertified ryegrass.</u>
Cow days per acre	327.8	272.9
Butterfat per acre	414.5	253.1

These figures show that in the 19 months that the trial has been down the carrying capacity has been increased by 20%, and the butterfat by 64%. The greater increase in butterfat is due to milking cows having been grazed on the certified area and drystock sometimes on the uncertified as at times it was considered that the latter would not maintain milking cows.

The amount of certified seed saved in those parts of Southland where the germination problem is prevalent is decreasing each year. Investigations into this low germination question have been conducted at various places and along various lines for some years but with little or no success at arriving at a satisfactory remedy. The cause of it, a fungus, was discovered some years ago by Mr. Hyde, of the New Zealand Seed Testing Station. Experiments designed to control this fungus have so far not been successful. The treatment of the seed with hot water before sowing, time of cutting, and differential manuring have given no solution.

The problem is now being approached from the strain point of view. It is thought that there is a possibility of isolating a good type of ryegrass which is resistant to the fungus attack. Some two hundred lines of ryegrass representing nearly all of the types that have been tested at the Plant Research Station, Palmerston North, have been sown at Winton and also at Palmerston North. The lines sown include, selections from single plants, New Zealand certified lines of various origins and histories, Australia, British Indigenous, and good commercial South Island types. It is proposed to harvest these separately and test them for germination thus being able to decide which types are resistant and which are susceptible. This information should give a good indication of the possibility of isolating a certain type with a view to further selection. It may even be possible to pick out resistant lines amongst the many certified lines that are in the trial. Also four thousand single plants from forty lines of good South Island ryegrass have been put out at Palmerston North for study and it is anticipated that it may be possible to make up a resistant strain which will conform to certification standard.

There is a fairly strong feeling in Southland that once the certified type of ryegrass becomes acclimatised to Southland, the germination trouble will disappear. This is highly problematical and there is just the danger in sowing again and again low germinating lines of certified seed grown in Southland that deterioration in type may be

fairly rapid, owing to the increasing proportion of viable seeds of the less susceptible false perennial types that are picked up in the course of once growing. Actually the type would be best maintained in Southland by the sowing of certified seed from districts growing a high germinating capacity for then one would be assured that no deterioration in type had taken place in the once growing.

The poor germination trouble is not confined to Southland. The Sandon and Hawke's Bay districts have grown this type for many years and have experienced the same trouble only to a lesser degree, in wet seasons. The 1929-30 season is an example of this when the germination in these districts was considerably lower than usual, some lines being down in the forties and fifties.

Certified ryegrass, in the South Island particularly, is likely to influence to a large extent the type of farming practiced. Whereas the use of short lived strains of ryegrass tended to shorten the rotation, the use of the certified strain will tend to lengthen the rotation and will certainly give a better return in the latter years of the pasture in any rotation practiced.

The following instances in connection with the performance of certified ryegrass may be of interest for discussion. They cannot all be regarded as generalisations and some should be regarded as particular instances only.

- a. Many cases have been seen where weed control has been evident through the use of certified ryegrass.
- b. Certified ryegrass has manifested its value by its ability to recover quickly after rain following drought.
- c. An instance is reported from Southland where stock preferred hay made from certified ryegrass to that made from the false perennial type.
- d. The effects of grass grub and severe frost are not as severe on certified ryegrass.
- e. The resistance of the certified type to rust attack is greater than that of the false perennial.
- f. Poaching of plots in winter has been more harmful to the false perennial than to the certified.
- g. The certified type has been noticed to be the first to commence growth in the spring.

The position of certified cocksfoot in New Zealand is very satisfactory. The only strain that has, in the trade, competed with the New Zealand is the Danish type. Trials in New Zealand by a number of people and experienced abroad all indicate that the Danish type is of little value except in countries where short rotation "hay" and "seed production" pastures are common. The Danish type may be of value in some countries but in New Zealand it is non-persistent, stemmy, and winter dormant, whilst the New Zealand type is the opposite in all respects and is by far the most valuable of the two. In certification trials of cocksfoot virtually no Danish cocksfoot is found, practically all being of the certified type. Nevertheless the certification of our cocksfoot is quite warranted as much of the Danish type would be sold, probably unknowingly, as New Zealand cocksfoot. That this would easily come about and damage

New Zealand's good name for Cocksfoot is evident from Australian experience. Although they are now large purchasers of New Zealand cocksfoot a considerable amount of Danish seed was sown in the past and many samples of Australian cocksfoot has proved to be of Danish or mixed types.

With regard to Brown top, certification has helped the farmer and a large number of people interested in the formation of lawns and playing areas. Prior to certification Red top was frequently advocated for hill country sowings and for lawns and there is some evidence of it being used as a substitute for Brown top. Dryland brown top and creeping bent have also been substituted for Brown top to the detriment of the hill pasture sowings on which they were used. For lawn work it is essential that reliance can be placed on securing genuine brown top and to this end certification is proving most valuable in both local and export trade.

certification
As Italian ryegrass is still in its infancy very little evidence of field experience is available at present although where it has been tested out against the commercial type, much of which is false perennial, it has been much superior in growth. As with other species there is a considerable amount of room for improvement. The aim is to produce a type that under fair to good conditions and treatment will yield well into the second year, as Western Wolds and most of the Italian ryegrass on the market at present is shortlived, producing a variable amount for one season only.

New Zealand certified grasses abroad.

During the past six years or so a large number of samples of our certified grasses have been sent to other countries for trial. Many seed merchants and research institutions have received samples whilst a few samples have also been sent to individual farmers. Batches of samples sent have ranged from a single sample to fifty or more samples of various species. Although a large number of individuals have been supplied with seed, the number who have sent in useful reports is comparatively small. Shortage of finance, draughts, and other unforeseen circumstances, have been responsible for many trials not being carried out, and in some cases reports received have been non-committal and comparatively useless. Nevertheless, especially from Great Britain and Australia where many lots have been sent, some very useful reports have been received.

Generally speaking our certified ryegrass and cocksfoot have become well established in Australia and Tasmania. This can be seen very forcibly in the way in which seedsmen's catalogues have featured our certified strains. From tests made at Palmerston North the best of the Australian ryegrass is very similar to our certified type and Australia is fully aware of this fact, and individual organisations have commenced certification of their own strains. Up to the present time any of the Australian certified seed that has been handled here is definitely not up to the best lines that have been received from there. Tasmania has a certification scheme in operation. In this they are certifying to once grown New Zealand mother seed only. At the present time Australia is the biggest buyer of our certified grasses, ryegrass and cocksfoot.

Great Britain and Ireland have also received many lots of seed. Opinions on Certified New Zealand or Akaroa cocksfoot are unanimous in their approval. There has been, and it appears that there will be for some time

to come, a steady demand from the British Isles for our cocksfoot. With regard to ryegrass, reports on this were at first largely of a condemning nature, later it was suggested that it might be as good as their ordinary commercial, whilst latterly, reports have been distinctly encouraging. The present opinion, which is fairly representative, is that our New Zealand certified ryegrass is definitely superior to the English and Irish commercial types and is second only to the best of their indigenous strains from Kent and Scotland. A Swedish late flowering type is also in greater favour than our type. One has only to look at the catalogues of some of the British seed firms to see the way in which our seed is being advocated. In their prescribed mixtures of superior strains New Zealand certified ryegrass is consistently featured with their own indigenous strains for permanent pasture as well as for short rotation leys.

With regard to other countries reports are in many cases either not to hand or very vague but it would appear that our certified ryegrass and cocksfoot are likely to be suitable on the coastal and more temperate regions of America and South Africa. Canadian experience indicates that the cold is too severe for our grasses except on the Western coastal districts in British Columbia where Ryegrass, Cocksfoot, and Brown top have all done well.

Reports from the U.S.A. are rather vague but indicate that our ryegrass is promising on the Western coast and to a lesser extent on the Eastern coast.

From reports received from South Africa it seems that in parts of a fair rainfall and comparatively high altitudes (up to 9000 ft. in Kenya colony) there is considerable promise for our ryegrass and cocksfoot.

In Europe generally, the countries, for various reasons such as climate or method of farming appear to prefer their own strains where these grasses are grown. In many places these grasses appear to be quite unsuitable irrespective of strain as reports have been received which state that no differences could be seen between our good and bad strains and that none was of any value.

The overseas position can be summarised as follows:

It is worth while following up our certified grasses in climates in temperate regions and with conditions somewhat similar to our own. They have proved successful in many parts of Australia, in Great Britain, the Western parts of Canada and U.S.A., and parts of South Africa. Although seed has been sent to South America no reports have been received yet.

It is the intention of the Plant Research Station to follow up reports of a favourable nature by sending further and larger samples to those places where there seems any likelihood of our species and strains proving satisfactory.