

RESEARCH PROBLEMS OF THE SOUTH., J. E. Macassey, Dunedin.

The **territory** referred to is that South of **Dunedin**, and does not include Central and North Otago, but is confined to South Otago, Eastern and Western Southland, where a fairly **heavy rainfall** is experienced in an average season, and which would vary from 30 inches in the neighbourhood of Balclutha, to over 40 inches in other parts, and where the hours of sunshine are less, than in other more favoured territories, and where cold bleak winters are experienced; consequently the conditions we have to contend with are, totally different from any other part of the Dominion.

The difficulties, we have to contend with, and the problems we have to solve are all connected with grass, grass land farming, and its associated winter and forage crops, and to commence with it is proposed to deal with the production of grass seeds of various descriptions in **this** particular district.

The value of the **export** trade in grass seed is one of greatest importance to the **Dominion** as a whole, but particularly to the producers in the South, as will be seen when you take the **individual figures into consideration:-**

	<u>SEVEN YEARS.</u>	<u>AVERAGE PER ANNUM.</u>
Ryegrass	to tal 9071	tons. 1296 tons.
Chewings Fescue	" 5151 "	736 "
Crested Dogs tail	" 1138 "	163 "
Brown Top	" 847 "	121 "
Cocksfoot	" 792 "	113 "
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With sundries	total over 17000 "	2500 "
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Of these quantities, it is estimated that the South provides the following percentages:-

Ryegrass	80%
Chewings Fescue	100% (nearly.)
Crested Dogstail	100% (")
Brown, Top	80%
Cocksfoot*	Nil

so that out of an average annual export of 2500 tons from this Dominion, the **territory** in question has been responsible for over 2000 tons. These figures **emphasise in** no unmistakable **manner** that the South is the district we must encourage to produce and to rely upon for supplies, if we desire this very handsome business to continue. No doubt, principally on account of the **climatic** conditions that prevail, we encounter various and many **problems and difficulties**, and which it is absolutely essential or necessary should be overcome, and which in the speaker's opinion will entail very **careful** and close **research** or **investigational** study, and as this is the district in which the quantity is produced, it is reasonable to suggest that this should be the district where this **investigational work** should take place. This paper proposes to deal with the various grasses previously referred to, and will take them in the order as already given.

RYEGRASS: There are at least four, **problems** to consider:-

1. Strain or type.
2. Palatability.
3. Germinations in wet season.
4. Non-persistence of average Southern seed.

Presumably it is agreed that the type we require is one that is not only persistent, but in addition is of high productivity and palatability, as well as of high nutritive value, or of a similar nature to the certified strains in its native environment in Hawkes Bay and Poverty Bay. The export figures of Ryegrass quoted, would consist principally of the ordinary southern seed, or what is known as the pseudo type, but unfortunately it has been condemned in no uncertain manner by most of the buyers who, until a few years ago, were in the habit of purchasing large quantities. These buyers include our own North Island, Australia, U.K., Europe and America, and it would appear that if the South wishes to continue to occupy the position of being the principal producer of ryegrass in New Zealand, then we will have to produce a type to satisfy our buyers not only in this Dominion, but in oversea countries mentioned, and not a type that is only saleable at a considerable discount and when there is a scarcity in other countries of production.

The question of the palatability of the certified strain in the South is one about which there seems to be some diversity of opinion, and while a number claim that their stock show a general distaste towards it, on the other hand others, in some cases neighbours - have not experienced this difficulty or objection. It is difficult to understand why this strain which is perfectly sweet and palatable in some districts, should not prove as satisfactory in other territories, and the problems that seem to arise are the following:-

Is it due to the variation in the type of Ryegrass itself?
 Is it due to the mixture sown with the Ryegrass?
 Is it due to the control or grazing treatment of the paddock? or
 Is it due to the top dressing or soil fertility?

These are questions and problems that only proper research work can solve.

GERMINATIONS IN WET SEASONS: Past experience has proved that in wet seasons the germination of Ryegrass is affected to some little extent, and this is a trouble we have had to contend with this season, but to a greater extent in the South than in other parts. It has been suggested that this trouble is due to a fungoid growth on account of the excess rain, and in view of the fact that we experience more wet seasons than in other Ryegrass producing districts, it is reasonable to suggest that close investigational research work is necessary to overcome this particular disability, and needless to point out, in the district where it is most prevalent.

In Hawkes Bay. 35 years ago, and still earlier, the usual procedure when sowing down a paddock for seed production and grazing purposes was invariably as follows:-

1. Utilising genuine old pasture seed.
2. Grazing the paddocks at least two, if not three years before seeding.
3. After this, only seeding in alternate years, and grazing in between.

The yield per acre from an old pasture in those days and later, in reasonably good seasons was in the neighbourhood of thirty bushels per acre from the mill, but I understand that in the last few years when different treatment has been meted out to the paddocks and they have been seeded in successive years, and perhaps continuously for a term of five or six years, that the yield from these paddocks has declined very materially, and it is reasonable to suggest that consequently the constitution of the ryegrass plants in these paddocks must have suffered, in fact deteriorated, and probably require resting.

In the South the general procedure for, the past forty years and earlier, appears to have been one of seeding the first season, and keeping on sowing the progeny, or in other words, treating the ryegrass like a crop of oats. No doubt, while very handsome yields were obtained, at the same time this treatment of continually sowing maiden seed must have affected the constitution of the plant, with the result it has developed into an annual one., more or less: The speaker may be mistaken, but he cannot help but suggest it would appear as if the days of the annual type are numbered, and unless we can produce a good type or strain of Ryegrass in the South to suit all purposes, this very handsome export business is going to be lost to the district. The methods that were in vogue in Hawkes Bay forty odd years ago, and which proved so satisfactory, should certainly be worthy of trial in this district. Is Ryegrass - certified or any other type - a plant that can be cropped continuously without deterioration to its constitution? Surely in view of the difficulties and troubles that have been experienced in recent years, the aforementioned method should be well worth a trial in every district, but particularly in the territory that has been producing Ryegrass in quantity in the past.

CHEWINGS FESCUE: This is a business that has developed to a considerable extent in the past twenty years, as mentioned in the statistics already quoted, and needless to point out, it has been of great value as an income earner for this particular territory. It has, of course, been strongly recommended by Professor Stapledon, of Aberystwyth, as being one of the best types of lawn grasses obtainable in commercial quantities. Unfortunately this seed in an average season does not retain its germination in a satisfactory manner once it is twelve months of age, and still further, at one time a considerable number of complaints were received through the loss of germination whilst in transit overseas, but this last trouble to a great extent has been overcome by shipment per cool chamber.

A certain amount of research work had commenced at the Gore Experimental Farm, but unfortunately for producers, as you are aware, this particular farm was closed down in 1934. In correspondence received recently from overseas buyers, several references have been made to the fact that there was an inclination towards the use of Creeping Fescue as against Chewings Fescue. There is not the slightest doubt that there must be some variation in individual types of Chewings Fescue, but as far as we are at present situated, very little is known on this subject, and in view of the value of this business to the Dominion as a whole, surely research and investigational work is justified in order to improve the strain or type of this plant, as well as methods of production, and decidedly in the districts where the production is.

In the past the U.S.A. have been our principal buyers, and needless to point out if this particular trade was lost to us, it would be a serious blow to the industry.

CRESTED DOGSTAIL: The Production of this seed is also practically confined to the Southern territory. According to English papers, they are evidently obtaining excellent results from an indigenous Dogstail, which is claimed to be more leafy and superior in every way to the ordinary commercial type, and in addition is drought resistant. I understand a limited amount of experimental work has taken place in the way of plot tests, but as far as I am aware, there has not been any conclusive research work to isolate distinctive types. Surely if we could produce a superior type of Dogstail, as is claimed for the indigenous seed at Home, it should be worth a considerable premium. This is another seed that should be worthy of research and investigational work, and again in the district in which it is produced.

BROWN TOP: This particular trade is, of course, one of somewhat recent growth, and it is **unfortunate** for this country that America a few years ago decided to place a prohibitive **tariff of forty cents per lb.** on importations. As far as is known at present, practically **the only distinctive types are** the ordinary, and the Dry Land seed. Several **references have** been made recently to the **Kentish** indigenous type which is receiving some publicity in the **United Kingdom.** I understand that at the Plant Research Station, Palmerston North, a certain **amount of research work** has taken place there, but in view of the fact that eighty odd per cent. of the **production** is confined to the South, surely it is this district where the **investigational** work should be carried out.

TIMOTHY: There is a limited production in one particular **district** - probably in the vicinity of 20/25 -tons. On the other hand the annual importation is **approximately 150 tons.** We believe very satisfactory results have been obtained from the Timothy pastures in the **South,** both from a grazing and seed production **point of view,** but whether this local **Timothy** has any particular outstanding virtues as compared with the ordinary imported seed, I cannot say. Some English authorities are strongly recommending the use of indigenous **seed** and claim **that** it has provided **245** tillers to **2½** sq. ft., as compared with only **70** tillers with the ordinary commercial seed. We have no record of any experimental work being carried out with this local Timothy, but it is obvious that if our particular Timothy is of a superior type, and somewhat similar to the English **indigenous** strain, it must be worth a considerable premium, and **consequently** be worth investigational work.

COCKSFOOT: Up to the present the production of seed in the **South** has been very limited, but the **quality is undoubtedly** very **heavy** and attractive, with the result that when machined, it has a considerably lower percentage, of **inert** matter than the average seed produced in Canterbury, and in addition germinates in a most satisfactory manner. **In view** of the South's ability **to produce** other seed to the extent it does, it would appear it is well worthy of an **attempt** to **grow** more Cocksfoot, as undoubtedly at the present time, at least, it must be a **very** remunerative crop to, the producers.

CLOVERS: The production of **clovers** up to now has been somewhat **limited,** although there has certainly been an appreciable **increase in** the White Clover harvested during recent years. **Unfortunately,** for some reason or other, the Southern seed, particularly from certain districts, usually **contains** an **appreciable** percentage of hard seed, running from **10% to 40%,** and needless to point out, this detracts **from** its value. **It** certainly would appear as if research work is required to **endeavour** to overcome this difficulty if we are to continue to produce this seed in the South. As you are aware, in the past Canterbury has been the main White **Clover** producing district, but that Province is subject to a considerable **variation in** **season,** and consequently cannot be depended upon for regular supplies of seed. It is known that regional differences occur in **White** Clover, and while a certain type is particularly suitable to one district, it has not proved to be of the same satisfactory nature when **transferred** to another territory. **This** **feature** of the plant should be well worthy of **investigation** to **ascertain** the significance of the variation.

We now come to the **pastoral** side of our problems, or those relating to the, production and fattening of **stock,** the grazing of our grass lands and the associated crops that are necessary to **carry** us through the **winters.** In this **connection,**

and to emphasise the importance of this industry in general, we desire to give some statistics of the increase in production during the past ten years:-

DAIRY PRODUCE, GRADED FOR EXPORT AT DUNEDIN AND BLUFF:

	<u>BUTTER.</u>	<u>CHEESE.</u>
1926/27	90,108 boxes.	155,640 crates;
1936/37	72,452 "	190,788 "

As you are fully aware, this past season was an exceedingly difficult one, and the general increase in production shown, under the circumstances, must be considered satisfactory.

KILLINGS AT FREEZING WORKS, including Burnside, Finegand, Mataura, Makarewa and Ocean Beach:-

	<u>CATTLE.</u>	<u>CALVES.</u>	<u>SHEEP.</u>	<u>LAMBS.</u>	<u>PIGS.</u>
1926/27 -	5,794	43	50,927	577,812	-
1936/37 -	8,118	47,561	206,582	1,705,375	7,031

Sheep - 300% increase in ten years.
Lambs - 200%

WOOL OFFERINGS - DUNEDIN AND INVERCARGILL.

1926/27	100,652 bales.
1936/37	150,150 "

or approximately an increase of 50% in ten years.

To provide winter, spring and fattening feed for all this stock, a considerable amount of cropping work is entailed, the main crop of course being swedes and turnips. The latest statistics show that out of a Dominion total of 427,000 acres, no less than 142,000, or a percentage of 33.6 of the total, was produced in the Southern territory, not including Central or North Otago. Unfortunately a good deal of disease is experienced in those crops, including Club Root, Brown Heart, Dry and Wet Rot, etc., and in an average season there is a perceptible loss, but it is difficult to say what this would amount to - possibly may be 20%. If you estimate this loss at a cost of say £3 per acre, you will doubtless realise it amounts to over £80,000 per annum. We are aware of the fact that a fair amount of investigational and research work has, and is taking place in order to overcome these difficulties, but in view of the serious nature of the annual heavy losses entailed through these diseases, surely it is a matter of urgency that this investigational work should be increased in order to solve these problems, and again in the district where the production and problems are.

The following are a few suggestions of other experimental and investigational work that this particular territory requires:-

1. Trials of new varieties of various roots and green fodder plants.
2. Manuring of root crops, etc.
3. Thorough top dressing trials and experiments, not merely cutting the grass and weighing it, but by weighing the stock on and off - not only the ewe itself, but the lambs, as well as the fleece - and at the same time ascertain the percentage of fat lambs off their mothers.

4. Trials to determine 'value of various fodder crops for lamb fattening purposes , including Lucerne, Montgomery Red Clover, etc. , under southern conditions. It has to be admitted that Rape in our territory in an average season does not give the same excellent results its obtained in the drier climates further North.
5. Determination of the importance of different varieties of Oats , new and old , and the manuring of same.
6. Investigational 'work into all ailments and diseases that attack stock of all descriptions at different periods of the year.
7. Investigation into control of cereal diseases in the South.
8. Work in connection with the control of pests, including Army Worm, Grass Grub, Diamond-backed Moth, etc. , etc.
9. Feed taint in dairy products.
10. Importance of maintaining supplies in the South of high class stocks of seed potatoes of good constitution and free of disease- Undoubtedly in the North, potatoes degenerate rapidly.

The foregoing are merely a few of the problems that require tackling, and are mainly associated with grass farming, and the investigations are all in connection with grass and feed - from the time of sowing, down the pasture, to the finished article in the way of meat, wool or dairy produce, as the case may be.

Very excellent service in the past, as well as at present, has been rendered by the various members of the Department of Agriculture who have been domiciled in this district, but our problems are really too great for them to tackle in a proper manner, and needless to point out, their activities are restricted to the means and facilities at their disposal.

In the North Island there are no less than ten demonstrational and experimental stations, of some kind or other, while in the South Island we have the Caathron Institute at Nelson, and Lincoln College near Christchurch, and in our particular district we have the Winton Demonstration Farm which is subsidised by the Department of Agriculture to the extent of £100 per annum, and where the area is small and the work is limited accordingly. When you take into consideration the production in the Southern territory; including seed , dairy produce, wool and frozen meat, and the 'increases in these productions - when you take into consideration climatic conditions, the rainfall, the cold, bleak winters - when you take into consideration the various and many problems and difficulties that seem to be more or less peculiar to the South, it would seem as if we can demand, and justifiably demand, that the Government should instal, and instal promptly , a complete and thoroughly equipped experimental farm and research station to carry out various experiments, and to thoroughly investigate the troubles and problems we have been facing for the past thirty or forty years. We would further suggest that the area should be at least 300 acres, and should comprise both first and second class land.

DISCUSSION.Mr. G.A. HOLMES, Wellington:

Mr. Macassey has had a lengthy experience both of commercial life and of practical farming. The figures he has supplied in his paper are most interesting as demonstrating the remarkable expansion of the fat-lamb industry in the past decade. His outline of the main problems demanding attention by research workers is most comprehensive, and his advocacy of the establishment of a Southern research and experimental farm would receive the unanimous support of Southerners.

Problems in connection with ryegrass were of particular interest owing to the increasing use of certified strains in the South. Farmers would never go back to the sowing of false perennial types, even though their revenue from seed production was jeopardised. Investigations might be commenced into the selection of truly perennial strains which would have also a high degree of resistance to the endophytic fungus causing loss of germination of the seed.

Rust affecting ryegrass warranted investigation, as the belief was held by sheep men, whether rightly or wrongly, that rust-infected ryegrass gave rise to troubles with lambs.

In regard to cocksfoot, whether for pasture or seed production, one difficulty was its slowness to establish, but this difficulty could be overcome by mixing the seed with the fertilizer and drilling it in at a shallow depth.

Mr. Macassey had shown that the Southern Provinces were pre-eminent in the production of Chewing's Fescue, Dogstail and Brown Top, and it was certain that organised research into the technique of production of these seeds would yield valuable results. Other species such as Timothy and Poa trivialis merited attention, as New Zealand was importing the bulk of her requirements of the seed of each of these grasses.

With the introduction of the crude-oil tractor, much cheaper cultivation was now possible, and this might lead to an increasing use of certified Italian ryegrass and to short rotation rather than permanent or very long rotation pastures.

THE CHAIRMAN:

One is fairly correct in saying that quite apart from all the specific instances Mr. Macassey has brought up with regard to investigational work and so on in the southern part of the South Island, one can epitomise the whole of his paper in a single sentence that is contained therein, viz., "It is a matter of urgency that investigational work should be increased in order to solve these problems, and again, in the district where the production and the problems are."

I must congratulate Mr. Macassey on weaving an extremely interesting and valuable paper around that sentence. I feel, however, that when he sat down to write this, it was not so much the actual problems that he was thinking about, as, "How are we going to make a start so that we can solve them."

I should like to mention that the matter of making reasonable provision for demonstrable and investigational work in the South Island has been brought prominently before the

Minister of Agriculture, and he feels that in order to get the position properly qualified in his mind it would be advantageous to have a small committee of the farming and commercial interests of the south, who are involved in the consideration of this matter, and the names of that committee are already in the hands of the Minister of Agriculture, who will issue to them what may be called their agenda at a very early date.

There is **one** point that should be emphasised with regard to the establishment of an experimental and research station in the south of the South Island, and that is: an essential point is that such establishment should be properly interlinked with the various other Research Stations in New Zealand, which are partly under the control of the Department of Agriculture and partly under the control of the Plant Research Bureau.
