

BEHAVIOUR OF NEW ZEALAND CERTIFIED CLOVERS
IN NEW ZEALAND AND ABROAD.

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Two species of clover come under certification. These are:

1. White clover.
2. Montgomery Red clover.

In both of these there are two classes:

- (a) Mother seed
- (b) Permanent Pasture seed.

In red clover there is little difference between the type of "Mother seed" and "Permanent Pasture" seed, but in white clover two rather definite types are included.

The Mother seed white clover is the tall growing, large leaved, highly producing type which we regard as the very best, for both dairying and sheep farming, where conditions are such that white clover will thrive. The Permanent Pasture class includes the Mother seed type once grown, and also a smaller leaved, somewhat lower producing, but highly persistent type which is excellently suited for harder sheep grazing.

Throughout New Zealand 108 trials have been conducted where certified white clover types have been tried against uncertified types and certified Montgomery red clover has been tried against Broad red clover. It is largely on these trials, and on some farmers' experiences, that these notes are based.

1. Certified White clover.

As yet there has been a very limited supply of certified Mother seed. In the 1931/32 season 1300 lbs. were harvested, and in the following season 3000 lbs. Accordingly there are relatively few areas which have been sown down with seed of this type. Where this type occurs naturally in Hawke's Bay and in North Canterbury it provides a tremendous bulk of luscious feed which is utilised mostly by dairy herds or by fattening bullocks, and where it has been sown in other districts suitable to ryegrass and white clover excellent results are being obtained also. Examples of this have been seen in Poverty Bay, South Auckland, Manawatu, Mid Canterbury, North Otago and Central Otago. At Ngakuru and Galatea a large part of the success obtained on pumice country is due to the use of Mother seed white clover. In the Manawatu, also, this clover establishes and grows particularly well.

The following figures show how the certified types compare with other types when grown, with ryegrass in a Mowing and Grazing trial at Marton.

New Zealand No. 1 (Mother seed) is taken as 100 in each instance.

					For whole year.	
	Winter	Spring	Summer	Autumn	Relative total yields grasses and clover.	Relative total yield of clover only.
N.Z. Mother seed.	No. 1 100	100	100	100	100	100
N.Z. No. 2 Permanent pasture seed.	95	85	90	94	90	65
Kentish Wild white.	97	82	78	90	86	50
Ordinary N.Z.	91	76	81	87	83	44
Imported Dutch.	76	62	81	86	75	25

These figures show that in each season of the year the certified types give the best yields of herbage. In the first five columns the yields shown refer to production of both grass and clover but the sixth column, based on dissection analyses of samples of out herbage, gives the relative clover yield.

The superiority of the certified types is most marked at the critical Winter and Summer periods, and this very early Spring growth and quick Autumn recovery after a dry Summer are valuable qualities. Certified white clover assists tremendously in providing the dairy herd with a supply of succulent feed which can be relied on, from season to season, and year to year, and the farmer obtains a pasture which will grow a thick mat which will prevent weed invasion and deterioration of his pasture.

Certified Mother Seed white clover is proving valuable not only for the dairy herd but also of wonderful assistance to the sheep-farmer. Growth starts early in the spring and gives plenty of feed for early lambing ewes. Many of the lambs can be fattened off in time to allow the paddocks to be shut up for a seed crop. When this has been harvested growth soon commences again and by the early autumn there is again first class grazing which, this dry year in the Manawatu, proved of great value as a green feed for lambs, and it is asserted that where sheep had access to this green feed little or no trouble was experienced with facial eczema in the flock grazing on it.

Where certified white clover has been sown in the South Island a seed crop is generally aimed at, but the accompanying benefits of better growth, and a longer period of production, together with recovery after drought periods have made it an important grazing crop as well. If irrigation can be practiced this clover can be used over very wide areas which now are affected by long summer droughts. In Canterbury, particularly, the application of water over the summer months enables a first class ryegrass white clover pasture to be maintained where stunted Browntop and flat weeds previously existed. The resulting clover growth can be managed either for grazing, or for a seed crop.

Certified Montgomery Red clover.

Montgomery red clover would appear to be valuable from two aspects:

- (1) as a seed crop for export
- (2) as a constituent of the permanent pasture, and possibly as a special purpose summer feed pa-sturo.

As a seed producing venture Montgomery red clover has distinct possibilities, but the price of the seed must be brought more in accord with that for the ordinary Broad red before it can safely be expanded. Montgomery red sets seed well in New Zealand, and given good seasons and a moderately fertile soil, it will yield almost as heavily as the Broad red. Good drops in 1934/35 yielded up to 2 sacks per acre but the highest yield of M/D seed as shown by the certification records are as follows:-

Season 1931/32	258 lbs. per acre.
" 1932/33	160 " " "
" 1933/34	160 " " "

Most of this seed was grown in South Canterbury and North Otago in seasons marked by drier conditions than usually prevail.

It would appear that Montgomery red clover prefers moist rather than dry conditions, and in this respect is more moisture demanding than Broad red clover. The yield secured at Palmerston North this year, from our pedigree strain was 344 lbs. of M/D seed per acre. In '19.33 a yield of 611, lbs. of seed per acre was secured but this stand was grown under ideal conditions

165. acres came into certification in the 1933/34 season, the total amount of M/D certified seed being 17,263 lbs. a.3 average of 105 lbs. per acre. There was a considerable increase in 1934/35 but the figures for that season are not available yet.

The practice in seed production with Montgomery red in New Zealand is much as for Broad red a hay crop is taken in November-December and the aftermath shut up for a seed crop. It is highly problematical whether this practice of, a hay crop is preferable to grazing the stand up till the end of November perhaps, but no definite data are available on this point. It has been shown definitely that a stand of Montgomery red clover is readily smothered out by allowing a dense crop to lodge, and it would appear that a reasonable grazing practice is preferable to the stand rather than either haying or seeding. One of the oldest stands of Montgomery red clover in New Zealand is that in the Leeston district sown there by the Canterbury Seed Co. in 1930. This has been hayed or seeded each year and last year it produced a very heavy crop. It would appear, however, that reseedling has had a good deal to do with the persistency of this stand.

Montgomery red clover in permanent pasture.

As a constituent of the permanent pasture Montgomery red clover is worthy of a place, and is to be preferred to the ordinary Broad red clover on account of its

more persistent nature, and less inclination to get out of hand in the first and second years of the pasture. The price of the seed, however, must conform more to the price of Broad red than it does at present before a general use will be made of this species as a pasture constituent. Montgomery red clover is essentially a summer pasture plant, and it would appear as if this is its greatest rôle in the pasture. In this respect it may serve well as a dominant constituent of special summer pastures that are managed so as to give optimum growing conditions for Montgomery red clover, i.e., grazed during the spring and then spelled, and reserved to fill the summer need, the spelling coinciding with the period of optimum growth for this red clover. Special pastures of Cooksfoot, Montgomery red clover, and certified Mother seed white clover may prove invaluable for this summer grazing.

Clover Strain Trials.

Establishment.

Field plot trials show that establishment of white and red clover is extraordinarily uncertain, especially where dry conditions have followed after the sowings. In Canterbury for example in 1930, 1932/33, and 1933/34 with Spring sowings very poor establishment of clover has resulted. Spring sowings in North Island districts subject to drought failed also this last year.

Consolidation of the seed bed is a vital factor in clover establishment. This has frequently been shown in our trials where the small area sown could not be rolled. Late autumn sowing - after the end of March - prejudices the chances of a good clover strike. It would appear that autumn sowing, in both North and South Island, where dry summers are experienced is distinctly preferable to spring sowings where clovers are concerned. Spring sowing is successful in districts of high rainfall, or where summer droughts are not experienced.

In comparative trials good clover establishment is essential owing to the fact that most New Zealand soils contain seed of volunteer white clovers which lie dormant until conditions become favourable for establishment and growth. The establishment of these, after the sown types have failed, may give an altogether wrong impression of the types actually sown.

In sowing down for dual seed production it is essential that both the Certified Perennial ryegrass, and the Certified Mother seed white clover establish. When the stand is let run to a ryegrass seed crop the first year, and heavy lodging occurs, the white clover sown may be entirely smothered out, and subsequent ingress of an inferior type of volunteer white clover would give disappointing results, and cause some concern when the clover crop was rejected for certification on account of being of inferior type.

From the foregoing remarks it will be seen that clover establishment in dry areas, and in Canterbury and Central Otago particularly, is a problem requiring serious consideration.

Effect of clover on the grasses of the sward.

During the course of strain trials throughout New Zealand ample evidence, has been secured in relation to the beneficial effect that clover has on the associate grasses of the sward, and instances have been recorded where the difference could be measured in terms of ammoniated super, the plots sown with good persistent strains of certified white clover appearing as though they had been topdressed with 3-4 cwt. ammoniated super as against no manure, where bad types of white clover were sown or where clover had failed to establish.

Persistency.

In all trials sown persistency has been a marked feature of all certified clovers and it would appear as if this will have an enormous influence in extending the range of the species as far as soil type is concerned. In the past we heard a great deal of certain types of country being unable to hold a permanent species whereas, to-day, by the use of certified strains, on account of their greater persistency, the same country is being permanently grassed.

Certified clovers over-seas.

Information regarding the performance of New Zealand certified clovers, when grown overseas, has been drawn from a summary of reports received from persons or institutions supplied with New Zealand seeds for testing purposes.

In the British Isles the certified types do well, and the growth characteristics seem to be similar to what they are in New Zealand. In practically every case the Mother seed type is superior to the Permanent Pasture type. In Great Britain the New Zealand strains are being recommended freely for use in short term leys.

From Denmark one report states good results, and superiority to Danish "Morso", but a different report shows little superiority to Danish strains.

New Zealand strains have proved suitable for the East coastal regions of the United States of America and Canada, extending within the latitudes 40° to 50° North. They have grown particularly well in British Columbia along the West coastal region of Canada. Anywhere inland in America or in Canada winters are apparently too severe and winter-killing of clover is general. Although winter killing has occurred in Alberta, Manitoba, Ontario, Quebec, and Kansas, a certain amount of satisfactory growth has been made inland at Ottawa, Maryland, Ohio, and at one place in Northern Ontario.

India and Burma have tropical climates to which our species are quite unsuited. Fiji and the Hawaiian Islands also, are too tropical.

The New Zealand strains have proved excellent for pasture purposes in Tasmania, and are doing well on the coastal areas of New South Wales, Victoria, and South Australia. Further inland droughts are the limiting factor unless irrigation is possible.

In South Africa unusual climatic conditions are met. Kenya Colony is in the Equatorial regions but all farming is done at high altitudes - up to 9000 feet above sea-level. Some of these parts are relatively cool and moist and have a climate similar to that of our North Island so New Zealand clovers can be grown there. In the Orange Free State, and Natal, in South Africa, the summer is the rainy season, and the winters are dry and cold. Farming there is done at altitudes up to 6000 feet and in some parts irrigation is necessary in the winter months. Mother seed white clover has proved particularly hardy under these conditions and helps materially in providing winter feed.

From 55 replies received from overseas testing stations,
 at 24 places certified clovers did well or excellently,
 " 15 " " " " moderately well,
 " 15 " " " " " badly,
 " 1 place the test was inconclusive.
 Total 55 overseas tests.

Few overseas stations have tested New Zealand grown Montgomery red clover but reports received indicate that it thrives in the same situations as those already mentioned as being where certified white clover will grow. The one exception is Ottawa where red clover plants are very susceptible, to disease and winter killing.

Three British plant testing stations state definitely that the New Zealand grown Montgomery is indistinguishable from British grown Montgomery.

Conclusion.

In regard to New Zealand, certified white clover all available evidence goes to show that in certified New Zealand No. 1 white clover, and pedigree selections of this type, New Zealand has a valuable pasture plant, and its advent is of equal importance to that of certified perennial ryegrass. As a pasture plant it is most useful, and the encouraging overseas reports on this type go to show that its seed is a valuable, readily exportable commodity. In the case of Montgomery red clover every effort should be made to contact the British market to ensure an outlet for New Zealand grown certified seed of this species, and an endeavour should be made to bring the price per lb. more in conformity with that of Broad red clover. This would have a marked effect on its wider use in New Zealand itself.