

Spring Oversowing with Clover on Raetihi Hill Country

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per cent. Only two samples tested, the burnt lime contents of which are recorded in column 1, could be regarded as first-quality burnt lime for industrial purposes. Hydrated lime, because of the added water, would contain not more than 75 per cent. of calcium oxide, and the sample containing 63 per cent. is therefore quite satisfactory.

Hard-burnt lime: Such lime is useless for industrial purposes, but being slowly soluble in the soil is still useful for agricultural purposes. Only a modern kiln under close supervision can be expected to produce a uniformly well-burnt lime without over-burning some of the rock.

Unburnt limestone: If there is insufficient heat and time for each piece of rock to be calcined completely, a core of unburnt rock will remain as carbonate of lime. The calcium oxide content of unburnt stone found in the samples is given in column 3. The actual percentage of carbonate of lime found is given in column 4. In samples giving a high percentage of carbonate and low burnt and hard-burnt lime figures evidently the time and temperature of burning were quite inadequate. Where carbonate and hard-burnt lime are both high the cause is probably the use of high temperature for a short time. A similar product would be left by taking out well-burnt stone for industry.

Importance of Calcium Oxide

For general agricultural purposes the value of a liming material depends on the total calcium oxide present, that is, the sum of columns 1, 2, and 3. Instead of the total calcium oxide, column 5 gives its equivalent as carbonate of lime, which permits a direct comparison of liming value with limestone. It is evident from column 5 that the industrial burnt limes have appreciably greater liming value than agricultural lime. The burnt limes sold for agricultural use, however, are only a little better (one is even poorer) than high-grade agricultural lime. A high-grade agricultural lime would contain about 90 per cent. of calcium carbonate, and column 5 shows several limes ranging from 86 to 105 per cent. of carbonate.

The current market prices for the various lime products show that although there is not a great difference in liming value between good, well-ground, unburnt limestone and the material that is sold as ground burnt agricultural lime under various names, the difference in price in favour of the former is so great that there can be no question that the unburnt limestone is by far the most economical liming material available to the farmers of New Zealand.

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OVERSOWING with clover in spring on the Raetihi hill country is good practice if Certified white clover is used and 2 to 3cwt. of phosphate is applied with the oversowing. *Lotus major* can be added with advantage to the white clover on the damper and shadier locations.

THESE recommendations arise from trials put down in the Pipiriki road district on an area typical of the moderately steep ash-covered hill country immediately west of Raetihi. This country has an elevation of 1600ft. and an annual rainfall of 63in. The pasture is dominantly browntop but includes danthonia, Yorkshire fog, sweet vernal, flat weeds, suckling clover, some crested dogstail, and a trace of white clover.

Phosphate the Dominant Factor

Topdressing with phosphate was by far the more dominant factor in the promotion of a higher-producing sward and even when oversowing was not carried out application of phosphate brought about a useful measure of improvement.

The clovers and seeding rates used were:—

	lb. per acre
Subterranean clover	.. 3
Certified white clover	.. 2
Kentish white clover	.. 2
Montgomery red clover	.. 3
<i>Lotus major</i> ½

The subterranean clover was a 50-50 mixture of the Tallarook and Mt. Barker strains.

Kentish white clover is a less vigorous type than Certified white clover and it was included to see whether it would establish better than white clover under relatively hard conditions.

The clovers were oversown in September and October on both sunny and shady hill slopes with and without phosphate and with and without lime. A further series of plots had an identical manurial treatment, but were not oversown with clover. This gave the following combinations:—

- Oversown clover,
- Oversown clover plus 3cwt. of phosphate,
- Oversown clover plus 5cwt. of lime,
- Oversown clover plus 3cwt. of phosphate and 5cwt. of lime,
- Phosphate (3cwt.) without oversown clover,
- Lime (5cwt.) without oversown clover, and
- Phosphate (3cwt.) plus 5cwt. of lime (without oversown clover).

Indications from Trials

The results from the trials indicated that:—

Establishment of subterranean clover from September and October sowings

was poor and did not warrant the cost of the seed. This pertained to both shady and sunny faces.

Certified white clover gave the best results over all plots. It produced good leaf and root development on both shady and sunny aspects.

Kentish white clover gave as good an establishment as Certified white clover but did not subsequently play as valuable a part in the pasture.

Montgomery red clover established quite well, but at no stage did the individual plants display vigour comparable to that of white clover.

Lotus major germinated well on the shady faces, where it continued to play a useful part in the sward. It was not a success on the drier, sunny slopes.

Application of phosphate was essential for the successful establishment of the oversown clovers. The plots where clovers were oversown without phosphate were essentially identical with the surrounding untreated pasture.

Topdressing with phosphate, without oversowing, markedly increased the suckling clover content and brought in a useful amount of volunteer white clover.

Application of lime did not result in any better establishment of the oversown clovers.

New Bulletin on Sheep Feeding in Canterbury

Canterbury has a balanced and well-developed sheep industry based on store-sheep production on the hill country and fat-lamb production on the plains. More than 5,000,000 sheep are carried, producing about 50,000,000lb. of wool and 2,500,000 fat lambs a year. In this state of high productivity feeding is the most important factor, and that is why every sheep farmer in the province will find much to interest and enlighten him, and perhaps to surprise him, in a new Department of Agriculture bulletin, "Sheep Feeding in Canterbury". The authority is I. E. Coop, Professor of Animal Husbandry at Canterbury Agricultural College, Lincoln.

A century of farming in Canterbury has been responsible for an accumulation of practical knowledge on sheep feeding, and to this knowledge has been added the results of experimental work carried out during the past 10 years by the Department of Agriculture and Lincoln College at the Kirwee experimental farm and at the college. In its three sections dealing with the feeding of breeding ewes, the fattening of weaned lambs, and the rearing of ewe hoggets, this bulletin represents an attempt to weld together information from the two sources.

Bulletin No. 355, "Sheep Feeding in Canterbury", is obtainable free from any office of the Department of Agriculture.