Canterbury Chamber of Commerce
Agricultural Bulletin

LUCERNE GROWING

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There are about 32,000 acres of lucerne in New Zealand, and the area is increasing at the rate of about 1000 acres a year. There are roughly 16,000 acres in each Island, the distribution in the South Island being 3000 acres, Marlborough, 5000 acres in Canterbury, and 8000 acres in Otago. Of these 8000 Otago acres, 7200 acres are in the counties of Waitaki, Maniototo, and Vincent, where irrigation is an important factor in the growing of fodder. In Southland, lucerne occupies only 24 acres, although in the area of grass cut for hay Southland is practically equal to Otago or Canterbury.

In New Zealand, there does not appear to have been any systematic investigation into the costs and returns from lucerne compared with other crops on the same soil; but the impression is generally held that on most farms a certain proportion, say 5 to 10 per cent., of the area, can profitably be laid down in this crop for the production of hay. Under good conditions, lucerne will produce 5 to 7 tons of hay a year, compared with about 2 tons from grass and clover. That lucerne is not more widely used is due to the fact that there have been thousands of trials and thousands of failures. Some of the failures may have been caused by lack of knowledge as to suitable soils and cultural processes, and it may be worth while to try once again, perhaps on a different part of the farm, using every means now known likely to assist in procuring a successful stand.

Climate and Soil.

Lucerne thrives best where the summer is warm and early, and this fact is emphasised by its extensive growth in the North Island and its neglect in Southland. The same thing is seen in Britain where, by the last available figures, there were 50,000 acres of lucerne in England, and only nine acres in Scotland. While summer warmth is necessary, winter cold is evidently not harmful, for the area where lucerne is most cultivated in New Zealand, namely, in Central Otago, is that in which the winter cold is more intense than in any other part of the Dominion.

As for rainfall, lucerne thrives under very moist conditions as well as under dry ones. This is shown by the fact that the area in lucerne is 5000 acres both in Taranaki, where the rainfall is 50 to 70 inches, and in Canterbury, where the rainfall is 25 inches.

Lucerne, like all other crops, does best on the best soils, and attempts to grow it on very poor soils have led to much disappointment. Past trials indicate that a light, thin, shingly soil with the water-table 20 feet or more down, is quite unsuitable to it, but sandy soils often grow very successful crops. Its success on the depleted areas of Central Otago has fostered the idea that it will do well on barren soils, but it must be remembered that the soils of Central Otago are inherently very rich, and are infertile only through lack of water. When water is applied by irrigation they become highly productice, not only of lucerne but of grass and clovers as well. The better the soil the better the crop of lucerne will be. In general, deep and well-drained soils with a pervious but not too open sub-soil will give the best results.

Preparation of Seed Bed.

Since a successful stand of lucerne will last for 20 years or more, it is obvious that it warrants much more expenditure in the preliminary preparation of the ground than any other crop, and that no operation that will ensure a good strike should be omitted. Lucerne starts its growth feebly, and is then easily injured by annual weeds and even after establishment it is easily choked by permanent invaders, such as white clover and various twitches. The land for lucerne should therefore be naturally free from weeds, or should be thoroughly fallowed to induce their germination and destruction, especially that of white clover. As a general rule, it pays to fallow the field for almost a full year before sowing the seed, working it periodically deeply at first, and then towards sowing time, with light harrows to secure weed destruction, moisture conservation, and a fine tilth. The best crop to precede lucerne is probably a mixture of oats and tares cut for hay. This smothers weeds, enriches the soil with its roots, and allows a full year for cultivation. After grass is another good position in the rotation, for here again the land is rich and clean. But the grass must be ploughed by January, so as to allow thorough working and the hand-forking, if necessary, of the last remnants or any patches of twitch. Other crops give a somewhat shorter time for fallowing, and are usually more weedy, though clean, well-cultivated crops of mangels or potatoes are in themselves a good preparation.

As a general rule, the land should be skim ploughed and well worked. Then deep ploughed once and once only, to bury the weeds. Then deep worked with grubbers, and finally surface cultivated with harrows.

Since lucerne does best where lime is abundant, the soil should receive about one ton of ground limestone an acre a few weeks before sowing. Amounts of two tons or more are advantageous. This rule is applicable to all localities, except Central Otago and those scattered localities where Black Medick (Medicago Lupulina) grows naturally. Black Medick is a trefoil a good deal like suckling clover. Its flowers are bright yellow, and the seed pods are almost round, dense black in colour, and a little bigger than rape seed. The leaves are hairy, and a small spike protrudes from the niche at the end of each leaflet. Black Medick is an excellent indicator of soils naturally suited to lucerne.

Inoculation.

On the roots of all vigorously growing clovers, peas, beans, tares, lupins, and lucerne, there are round lumps called nodules. The nodules are individually about the size of turnip seeds, but they may be bigger, or may be accumulated into masses as big as a hazel nut. They are caused by special bacteria, which are necessary for the healthy life of the plant. The nodules often come naturally, the bacteria producing them being carried on the seed, but on the other hand they frequently fail to develop. A crop without nodules, although it may start well, becomes yellow and sickly in its second year, and finally becomes so unproductive that it has to be ploughed up. Various methods of inoculation have been used, but the best is that now provided by the Plant Research Station at Palmerston North. The material is sold in small bottles, each containing enough to treat 30lb

of seed and full instructions for its application accompanying each bottle. The cost amounts to one shilling per acre, and this is so small that inoculation should never be omitted. The Plant Research Station last year sold enough inoculum to treat the seed for 4000 acres.

Manuring.

The opinion was freely expressed some years ago that manuring causes the lucerne plant to develop surface roots at the expense of the deep roots and so to limit its permanent production. This opinion has definitely been proved erroneous and the advantage of manuring in almost all circumstances has been fully proved. The best manure is equal quantities of lime and super sown with the seed, using 3, 4, or 6cwt of the mixture per acre, according to the rainfall. Super alone may check the germination of the seed, and definitely does prevent the early formation of the nodules that should develop from the inoculation. After the crop is established an annual top-dressing with 2 or 3cwt of super and 4 or 5cwt of lime per acre is advantageous in practically all localities except central Otago. The top-dressing should be applied just as the lucerne starts growth in spring; earlier applications stimulate grass which may have invaded the lucerne, rather than the crop itself. In the wetter districts basic slag applied at the same rate is preferred to super.

Sowing.

The seed bed should have been made firm by repeated surface harrowings and where the conditions are dry, by a final rolling. As a rule it is most satisfactory to sow the seed by cross-drilling, using every coulter and placing the seed as shallow as possible consistent with its reaching the moisture. If broadcasting must be adopted it is a good plan to use the Cambridge roller immediately before sowing and then to harrow lightly after the seed. The best time to sow is in November or December. This allows time for good cultivation and for killing several crops of spring weeds. The light spring cultivations should have kept the moisture near enough to the surface to allow the coulters of the drill to place the seed where it will germinate quickly and evenly, and the soil is warm enough to secure rapid early growth.

Lucerne is sown when the turnips are being sown. The better cultivation justified by the longer life of the lucerne, is almost certain to secure a strike. If for any reason the lucerne must be sown in October it is sometimes the practice to add a very light seeding of barley through alternate coulters to protect the young lucerne plants, but the barley must be cut before its presence does any damage.

From 14 to 18 pounds of seed are used per acre, the greater quantity where it is broadcast. Marlborough seed is as good as any in the world, and certain new varieties extensively advertised have been insufficiently tested to warrant their recommendation.

Early Treatment.

In the first few months after sowing, lucerne often grows thin and spindly and is threatened by extinction by weeds. In this case it is the custom to mow the crop lightly so as to check the weeds, and the mowings since they are not worth raking, are usually let lie as a mulch to the crop. This procedure is necessary only when the weed invasion is serious. Lucerne should not be cut until about 10 per cent. of the plants are in flower. At this stage, new shoots will be found to have developed freely at the base of the plant and so be ready to make new growth immediately after mowing. Cutting earlier than this entails a period of non-production while the shoots are forming; cutting later, involves destroying these young shoots. Thus, even in the sowing year, lucerne should not be cut until it commences to flower, unless the cutting is vitally necessary to check weeds.

Subsequent Mowings.

During the winter, lucerne is entirely dormant and nothing can be done at that stage. When growth starts in September the top-dressing may be applied, and often the mower is run over the crop to remove the straggling parts of last season's growth, but without cutting the young shoots. The first cut is usually ready in November, and there is a tendency to take this cut before flowering starts. In the North Island the first cut, owing partly to weeds and partly to rain, is often made into ensilage. There will be two and possibly three or more subsequent cuts during the season, each one again being taken just as flowering starts. These later cuts should be made into hay.

Cultivation.

The extraordinary amount of bad treatment that lucerne will survive, and the free growth of plants that appear to have been killed by cultivation, have led at certain times and places to extreme cultivation during the winter. Now lucerne has no means of increasing itself once the stand is established. There are no runners or underground stems, and seedlings never mature because their weak growth in the first year is choked by the overwhelming growth of the older plants that surround them. A thin stand of lucerne can never be thickened. But cultivation by any means will finally result in a thin stand, and the effect will be reached the quicker, the heavier the implements used. Heavy grubbings and diskings will kill some plants at every stroke, and the stand will finally become so thin that weeds will gain ingress, production will fall off, and the field will finally have to be ploughed up.

Cultivation should therefore be avoided unless it is urgently necessary, and then it should be done so as most quickly to achieve its purpose. If the object is to check weeds, then the cultivation should be done when weeds are most easily killed. Sometimes this is just before the lucerne starts growth in spring, but usually it is after one of the mowings in late summer or autumn. The implement used should be the lightest that will achieve its purpose, and in all cases very narrow tined cultivators, such as the Lincoln type of grass harrows, should be used.

Grazing.

If lucerne is wanted for a permanent hay crop, grazing should never be practised, but it is sometimes almost unavoidable. The time at which grazing does the least harm is in the autumn, after the final hay cut, when it may be used to remove growth hardly worth cutting, but too good to waste. Grazing in winter, especially where sheep are used, results first in injury to the crowns, and so in the death of the lucerne plants; and second, in the consolidation of the soil, which induces grass growth and encourages the fatal grubbing and disking.

On the other hand, it may be most profitable to regard lucerne as a temporary hay crop to be grazed whenever the need arises. Both lambs and dairy cows are frequently grazed on lucerne, and this is more suitable in autumn than for earlier in the season. Stands frequently or closely grazed cannot be expected to last for many years.

Haymaking.

The time for cutting lucerne for hay has been indicated. After cutting, the hay should lie in the swathes only a short time, or the leaves will fall off, and thus the most nutritious part of the hay will be lost. As soon as it is at all dry enough, the hay should be cocked, and the cocks stacked as soon as the stalks have lost enough of their moisture to make stacking safe.

Baling lucerne hay direct from the windrow or from the cocks is good practice. It can be baled greener than it can be stacked, there is less loss of leaf, and the feeding out in winter is much more convenient.

Summary.

Use good land for lucerne.
Use oats and tares as a preparatory crop.
Fallow thoroughly to kill weed seeds.
Lime before sowing.
Inoculate the seed.
Sow in November or in December.
Use super. and lime with the seed.
Do not cultivate in the dead of winter.
Top-dress annually as growth is starting in the spring.
Cut when 10 per cent. of the plants are in flower.
Never graze permanent hay-making stands unless under compulsion.
Cock and stack before the leaves fall off.
Bale rather than stack.

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