

# CANTERBURY CHAMBER OF COMMERCE

## AGRICULTURAL BULLETIN

# LUCERNE GROWING

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Lucerne is a fodder crop capable of high production over a wide range of soils and great diversity of climates. As it is rich in minerals and protein, lucerne, when grazed or fed as hay or silage, provides a suitable food for high producing stock. With its deep root system and comparative freedom from disease, it can be relied upon in dry seasons when many other crops fail. In view of its many advantages lucerne should be more widely used. The area of lucerne in New Zealand steadily expanded until 1944 when 46,455 acres were grown. Since then there has been a slight falling off in area, more particularly in the North Island where only 11,000 acres compared with 20,000 acres previously, are grown. In Hawke's Bay there are 4000 acres of lucerne. Canterbury grows 17,000, Otago 10,000 acres, more particularly in the irrigation areas, and Marlborough 3000 acres, a total of 41,000 acres in 1946. The main use for lucerne is found in the drier areas where pasture growth is often inadequate for times of shortage. In areas favoured with a better grass climate improved methods of pasture establishment and management have resulted in a decrease in the use of lucerne. Nevertheless valuable stands of lucerne are found in many high rainfall districts with highly beneficial results in stock thrift. That lucerne is not more widely used is partly due to the fact that there has been a high percentage of failures, many of which have been caused by lack of knowledge as to suitable soils and cultural processes. In many cases where such failures have resulted growers should try again along the lines indicated in this bulletin, undertaking at first a small but economic sized area.

With the development of irriga-

tion in Canterbury lucerne must come into much greater use. Under irrigation conditions on light land at the Seafield Irrigation Farm up to six tons of lucerne hay per acre were cut annually.

### CLIMATE AND SOIL:

Lucerne thrives best where the summer is warm and early. While summer warmth is necessary, winter cold is not harmful, as has been proved in Central Otago. As for rainfall, lucerne thrives under dry as well as under moist conditions where good drainage is provided. Like all other crops it does best on the best soils, and attempts to grow it on very poor soils have led to disappointment. With its deep root system lucerne does not thrive on soils with poor drainage or an impervious subsoil. If the soil selected is not naturally fertile heavy manuring is necessary. A green manure crop such as lupins can be used as a preparatory crop to improve light soils.

### PREPARATION OF SEED BED:

Since a successful stand of lucerne will last for 5-10 years or more, no cultural operation which will ensure a good strike should be neglected. Lucerne is easily injured by annual weeds and even after establishment it is readily choked by permanent invaders such as white clover, *Poa annua* and various twitches. The land for lucerne should therefore be free from weeds, or should be thoroughly fallowed to induce their germination and destruction. As a general rule it pays to fallow the field 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 crops to precede lucerne are crops such as potatoes,



roots, lupins, etc., which allow a thorough working of the soil over a lengthy period. If sown after grass, the land must be ploughed in early autumn to allow thorough working and complete eradication of any patches of twitch. Several ploughings may be necessary. Well established lucerne, however, can compete successfully with Californian thistle and will assist in the eradication of this weed from arable land.

Once the land is clean the final deep ploughing should take place as early in the spring as possible. One or two grubblings may then be necessary but the final seed bed preparation can be secured by harrowing at intervals of about one week over a period of several weeks. Harrowing twice weekly for the last two or three weeks before sowing will further assist to germinate weed seeds and to compact the soil. It should be rolled before sowing. A seed bed for lucerne can rarely be too firm. Rolling is especially important on areas where considerable working has been necessary to eradicate twitch and on areas where the soil is of a sandy nature. On highly fertile land lucerne may be sown by underseeding in the spring on an autumn-sown cereal crop. It may also be successfully established by drilling shallow on a spring-sown crop. This procedure, however, is not recommended on lighter land.

#### LIMING:

Since lucerne does best where lime is abundant, soils deficient in lime should receive about one ton of ground limestone an acre a few weeks before sowing. Applications of up to two tons or more may be advantageous.

#### INOCULATION:

Inoculation is essential. On the roots of all vigorously growing clovers, peas, beans, tares, lupins and lucerne there are small nodules. Individually, the nodules are 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 growth of the plant. The nodules often come naturally, the bacteria producing them being carried on the seed. Frequently, however, they fail to develop. A crop without nodules, although it may start well, becomes yellow and sickly in its second year and finally becomes unproductive. Various

methods of inoculation have been used but the simplest method is to use inoculating material obtainable from the Plant Disease Division through seed merchants. This is sold in small bottles, each containing enough to treat 30lbs of seed, and full instructions for its application accompany each bottle. The cost amounts to one shilling per acre.

#### MANURING:

On most soils the advantages of manuring have been proved. The best manure is composed of equal quantities of lime and super sown with the seed, using from three to six cwt. of the mixture per acre, according to the rainfall. Super alone is not recommended. It may check germination of the seed and definitely prevents the early formation of the nodules that should develop from the inoculation. After the crop is established an annual topdressing with two or three cwt. of super and four or five cwt. of lime per acre is advantageous in practically all localities except Central Otago. The topdressing should be applied just as the lucerne starts growth in spring or after the first cut. Earlier applications tend to stimulate grasses and clovers which may have invaded the stand.

#### SOWING:

The seed bed should have been made firm by repeated surface harrowings and by a final rolling. As a rule it is most satisfactory to drill the seed with the manure in seven-inch rows. The seed should be just covered and not buried. This is important. If it is placed at a depth of more than half an inch a poor strike will result. To ensure shallow drilling it is best to use old worn coulter or turnip coulter and to set them so that they are merely scratching the rolled surface. If a little seed and manure are visible in the coulter marks, i.e. if the seed and manure are not all covered, the depth of drilling is ideal. A general harrowing after the drill is unnecessary. The lucerne should strike in four to six days. If broadcasting must be adopted it is necessary to use the Cambridge roller immediately before sowing and then harrow lightly after seeding. The crop may be sown any time from August to March according to soil and climate but usually the best time to sow is in November or December. 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 growth. From 14 to 20 lbs of seed are used per acre, the greater quantity where it is broadcast.

#### VARIETIES AND STRAINS:

An improved strain of New Zealand certified lucerne has been released by the Agronomy Division. This strain is earlier, more leafy, finer in the stem than Marlborough lucerne and is highly productive. This seed is available as N.Z. Certified Lucerne. A new type of lucerne (*Medicago glutinosa*) is being studied by the Agronomy Division. The growth habits of this plant seem to indicate that it may be suitable for stock grazing. The selection and improvement of the strain is being carried on in the hope that a plant of value to farmers may result. It is a low growing type of plant and has a limited capacity for spreading by underground and overground creeping stems which produce roots along their length.

#### EARLY TREATMENT:

In the newly-sown stand annual weeds often establish along with the lucerne. If these should in any way check or retard maximum lucerne growth, the area should be mown when the average growth is between nine inches and one foot.

The mown material, if thin, will not smother the lucerne but where it is lying at all thickly it should be raked and removed.

#### TIME OF CUTTING:

Lucerne should be cut well before it has reached the flowering stage. It is usual to recommend that it be cut when new shoots are appearing at the base of the plant, as this avoids a non-productive period while the shoots are forming. However, the value of lucerne hay is in its leaf, not the stem. If cutting is delayed, the lower leaves turn yellow and drop off during haymaking, resulting in a stemmy hay. Therefore, it is recommended that cutting be carried out earlier than above and before the yellowing of the lower leaves occurs. During average seasons on medium land the first cut may be ready in the latter half of October or early November and subsequent cuts at approximately six weeks intervals throughout the season.

#### SUBSEQUENT TREATMENT:

During the winter lucerne is normally dormant. It is advisable to let the crop go into the winter with 2-3 inches of growth. This will be frosted but it acts as a protection to the crown of the plant and allows a quick start in the spring. In the North Island the first cut is often made into silage, partly on account of weeds and partly because of rainfall. If the weather is at all suitable the later cuts may be made into hay.

#### CULTIVATION:

The extraordinary amount of bad treatment that lucerne will tolerate 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. Marlborough lucerne has no means of increasing itself once the stand is established. There are no runners or underground stems and only a small number of seedlings will establish in an old stand because their weak growth in the first year is often choked by the overwhelming growth of the older plants that surround them. A thin stand of lucerne can never be satisfactorily thickened. Cultivation by any means will finally result in a thin stand—consequently grubblings and discings should, when possible, be avoided. 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 or grass harrows should be used.

Sometimes the stand is cultivated in the autumn and a sowing of Algerian oats made with the object of providing greenfeed, checking winter weed growth and contributing a first hay cut. As long as it is realised that each cultivation is liable to kill a number of lucerne plants and thereby cause the stand of lucerne to thin out, this practice has some merit.

#### GRAZING:

If lucerne is wanted for a permanent hay crop, grazing should not be practised if it can be avoided. The time at which grazing does the least harm is in the autumn after the final hay cut, when stock may be used to remove growth hardly



worth cutting, but too good to waste. Hard grazing in winter, especially where sheep are used, results in injury to the crowns, in the death of the lucerne plants, and in the introduction of grass and other weed growth. On the other hand it may be 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 but care should be taken to avoid bloat.

The main precaution to be taken in the management of permanent grazing stands of lucerne is to avoid continuous hard grazing. When the stand is grazed intermittently, i.e., allowed to grow a foot or more and then grazed off quickly, in breaks if necessary, it will persist for several years.

Lucerne is of tremendous value for early spring grazing for ewes and for summer grazing in the drier areas, particularly for lamb fattening. Wider use could be made of it for this purpose. Marlborough lucerne has been used fairly extensively as a component of pasture mixtures in drier areas. The improved grazing lucerne should be more permanent.

#### HAYMAKING:

The time for cutting lucerne for hay has been indicated. After cutting, the hay should lie in the swathes a short time and turned while the crop is still tough. It should never be handled when the leaves are dry and brittle, or the leaves will fall off and thus the most nutritious part of the hay will be lost. As soon as it is dry enough the hay should be raked into windrows. It can then be cocked and later stacked as soon as the stalks have lost enough of their moisture to make stacking safe, or it can be baled or stacked direct from the windrow.

#### LUCERNE AS A SEED CROP:

In districts with a hot, dry autumn the second or third cut of lucerne may be saved for seed. Most of the seed is harvested in Marlborough. In Canterbury, success depends on the season, but generally yields are low.

The second cut is preferred as the yields from the third cut are lighter owing to dry weather. The best stage for cutting is when two-thirds

of the pods are black or brown and most of the leaves have fallen. The crop may be cut with a binder and threshed from the stook, but it is more usual to use the header harvester threshing either from the windrow or by direct heading.

A yield of 200lbs per acre is a fair crop.

#### USES OF LUCERNE:

It is commonly accepted that a high-quality fodder plant such as lucerne makes good hay. It also makes good silage. Both hay and silage may be fed to dry and milking cows. Horses do well if fed a ration of lucerne hay in racks in their paddock over-night and for horses not in work lucerne hay may very largely replace oat sheaf chaff. Lucerne hay is an excellent sheep feed in winter and it can be fed to lambs on rape or other succulent feeds with considerable advantage. Chaffed lucerne hay forms an important part of the ration of stud sheep, is of value to the poultry industry and is to some extent used as a part of the diet of pigs. Properly saved lucerne hay from stands cut in the succulent stage is in good demand at high prices by race horse owners. The fact is that, if properly saved and cut at the right stage, lucerne is of great value on most farms for feeding to the various classes of stock or for sale. Silage made from lucerne is less flexible in its uses but may be fed to cattle and sheep which, as soon as they acquire the taste, eat it greedily. When the weather will not permit the making of good hay, silage should always be made. Those farmers who grow lucerne rarely experience a feed shortage.

#### SUMMARY:

- Use suitable land.
- Fallow thoroughly to kill weed seeds.
- Lime before sowing.
- Inoculate the seed.
- Drill on a firm seed bed.
- Sow in November or in December.
- Use super and lime with the seed.
- Avoid cultivation of the stand in winter.
- Topdress annually as growth is starting in the spring.
- Cut early.
- Use lucerne hay for all classes of stock.

Copies of this Bulletin may be obtained from the Secretary, Canterbury Chamber of Commerce, P.O. Box 187, Christchurch.