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The Establishment of Permanent Pasture in Canterbury

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Introduction

In Canterbury there is a wide diversity, not only of farm type but also of the management practised in utilising the land to best advantage. Climate and soil types combine to create this position, and in dealing with the subject of this bulletin, an appreciation of the farming situation as a whole is essential.

There are areas where practically no cultivation is carried on, the land being devoted entirely to grazing, e.g. the "back country" and Banks Peninsula; areas of limited cultivation such as the rolling downs of North Canterbury and areas where a large portion of the farm may be under the plough each year, as is the case on the plains where green feed and cereal cropping make up the greater part of the year's operations. Again there are limited areas of heavy fertile land where dairying is the main pursuit but where cropping of small areas may or may not be carried on. The clay downs of the foothills extending from Waiau in the North to the Waitaki River, in a more or less continuous chain, present a special problem in pasture establishment and management.

To cover this wide range of pastoral possibilities in detail would be beyond the scope of this bulletin so the work will be confined to the stating of fundamental principles with the interpolation of specific recommendations of importance to each class of farming.

Pasture Establishment

Four main principles govern the successful establishment of pastures.

(1) Soil fertility.
(2) Seed bed preparation.
(3) Class of seed sown.
(4) Time and method of sowing.

Soil Fertility: There are two aspects of this question which must be considered. The first and obvious one is that to ensure strong pasture growth the land should be in reasonably fertile state. This may be the result of naturally fertile soil conditions such as are found in our heavy land, or it may be necessary to fallow or grow a soil-improving crop, and apply fertilisers—superphosphate and lime at the time of sowing, in order to provide readily available plant food for the pasture plants in the early stages of the pasture's life. Draining of land is also an essential requirement for high fertility and in wet, waterlogged locations, tile or mole drainage should be carried out before a permanent pasture is laid down, if from a financial point of view it is practicable to do so.

The second aspect of soil fertility is one which is of special interest on cropping farms where the establishment of a 5-7 year pasture follows a cycle of cultivation and cereal cropping. The main purpose of the pasture is to provide suitable grazing for stock, but the additional function is to restore the fertility drawn from the soil during the cropping period. This is done thoroughly and efficiently only when a good dense turf is established, capable of carrying many stock so as to gain an accumulation of dung and urine and at the same time blanket the soil with a dense vigorous layer of grass roots and residues. To attain this end the grass seed should be sown on a seed bed which will encour-

age rapid, vigorous growth of grass and clover and the development of a dense sward in a short time.

Seed Bed Preparation

It must be appreciated that all cultivation prior to the sowing of permanent pasture should be aimed at the production of a well drained, weed free, fine, firm, seed bed. The achieving of this fundamentally desirable end, or of the degree of perfection possible on any farm depend on several factors; the nature of the soil, climatic conditions experienced during the months prior to sowing, the system of management followed on the particular farm, and the mechanical and financial resources of the farmer. All these combine to give rise to the wide range of methods found in Canterbury. Some of these methods give highly satisfactory results, others are reasonably successful, while others again work under a wide margin of uncertainty as to their final success.

Ideal methods are not always possible or even desirable in many cases, but too often short cuts are adopted which might well be discarded if there was a clear realisation of the vital importance of good pasturage on our farms—and particularly our cereal cropping farms. Too often grass is regarded as a "catch crop" designed to fill the gap between one series of crops and the next. Such an attitude leads to indifferent workmanship in the soil preparation preceding sowing and consequent poor pasturage as a result.

The following is a brief outline of the methods encountered in the province:—

(a) Spring sowing under a cereal, wheat or barley. The cereal crop is rolled and/or harrowed in September when the crop is about 3 inches high, the grass seed is broadcast without manure as a rule and allowed to come away under the growing crop.

(b) Autumn sowing after the harvesting of a cereal crop. The land is worked up rapidly after the crop comes off and the grass seed is sown with super.

(c) Spring sowing with a forage crop, such as rape. In this case the land is winter fallowed, worked down and both rape and grass are sown in October. Sowing with turnips is similarly attempted.

(d) Autumn sowing after rape. In this case the fed-off rape land is disced or grubbed to a depth of 2-3 inches, harrowed and rolled. The grass is broadcast, usually early in March.

(e) Sowing after fallow in spring, late summer or early autumn. The land is usually ploughed in late September, summer fallowed and sown at any time from New Year onwards, depending on the weather.

Method (a) is at the present time the most common on the wheat farms of Canterbury. At best it can be regarded as a cheap way of doing the job; it is not, however, a wholly successful method as the resulting pasture may be good, bad, or indifferent, depending on the weather experienced in the weeks immediately following the harvesting of the grain crop. As a rule in Canterbury, January and February are dry months, the young grass exposed in the stubble to the heat of summer wilts badly and unless adequate rain falls all the clover and a great deal of the grass dies, leaving a 50 per cent pasture or worse. On the average it would be safe to say that in only one year in five will this method give a worth-while high class pasture, except in districts where summer rainfall is normally experienced.

The same objections apply to method (b) as it is obvious that during a dry autumn the stubble may not be fit to work up until well into March or April. Grass sown then will be late striking and the loss of young seedling plants through frost-lift may be severe.

Spring sowing with rape or turnips (c) has for years been regarded as one of the safest methods of pasture establishment, and so it is, provided the farmer goes for a pasture with the cover crop as of secondary importance. If, however, the rape or turnip crop is too heavy, the young grass will tend to be smothered, and later on the heavy stocking necessary to deal with the crop may be responsible for the destruction of a large proportion of the grass and clover plants. With turnips too, winter

feeding in a wet year results in the land being badly poached and the grass again is thinned out.

The autumn sowing of rape land after the lambs have been fattened (d) has proved highly satisfactory in North Canterbury. The shallow working keeps the plant residues and dung near the surface and provided the grass receives a reasonable rain in early autumn, it will grow very fast and develop a good roothold before the winter sets in.

It is the last mentioned method of sowing, after fallow, which though it is not yet widely practised, has proved to be the most certain method of establishing a first class pasture. The summer fallow, even of three months' duration, renders the soil clean, fine and fertile so that the seed bed encourages rapid, certain germination of the seed.

The actual selection of the method of sowing is usually determined by the various conditions governing the management of the farm as a whole, and in practice there is most often a combination of all the methods outlined above. But while it is important to recognise the part which expediency plays in arable farming, it is important, too, to stress the fact that too often the apparently easy way to pasture establishment is in reality the most uneconomic, and is far too often resorted to because of lack of farsighted planning in the first place. Arable farming does not work on a year to year basis but rather must the scope of operations be considered over several years, covering what is commonly called the rotation cycle. When the rotation cycle involves the ploughing of old grass and the sowing down of new pasture, plans should be made to ensure that as much of the new grass as possible will be laid down in such a way as to ensure good pastures. And of all the methods available, sowing on stubble is the least satisfactory while sowing on fallow gives the best guarantee of success.

Class of Seed Sown

Two main points must be considered—(1) Seed Quality; (2) Species and Strain.

(1) Quality: Seed sown should be of known purity and germination. Although this would appear to be a self evident fact it is still far too common to find farmers accepting seed of inferior quality because of its so-called cheapness. Poor seed is never cheap—and there are no exceptions to this rule of good farm husbandry. If there is any doubt about a line of seed a certificate of purity and germination from the Seed Testing Station at Palmerston North should be demanded.

(2) Species and Strain: The species of grass sown should suit the requirements of the farm; consider the matter under the headings—rainfall, soil type, and utilisation. This latter item is just as important as the others; it is not good policy to overlook the fact that the saving of grass seed is a valuable source of return from our pastures, hence the necessity to avoid the mixing of species which will not allow of reasonably easy harvesting or which may, by their association, lower the quality of the resulting seed crop, e.g., Italian rye with Cert. Perennial rye.

Of each selected species the most desirable strain should be sought. The Government Certified grasses and clovers are available in the following grades:—Government Stock; Pedigree; Mother Seed; Permanent Pasture. Where there is a possibility of subsequent seed crops being harvested, Stock or Pedigree grades should be sown, but for normal grazing requirements Mother or Permanent pasture grades are cheaper and almost equally good.

Grass Seed Mixtures for Permanent Pastures

There is a wide margin of selection as to the mixing of species for permanent pastures. The following may be taken as guides for general purposes.

North Canterbury Seaward Downs—	
Perennial Ryegrass	25 lbs.
x Crested dogstail	3 lbs.
White clover	2 lbs.
Broad red clover	3 lbs.
Subterranean clover	3 lbs.
Plains "Wheat" land—	
Perennial Rye	25-30 lbs.
White clover	2- 3 lbs.
xx Red clover	4 lbs.

Heavy dairying land—

Perennial Ryegrass	15 lbs.
Cocksfoot	12 lbs.
x Timothy	4 lbs.
Montgomery red clover	4 lbs.
White clover	2 lbs.

South Canterbury Downlands—

Perennial Rye	25 lbs.
x Crested dogstail	3 lbs.
Montgomery red clover	4 lbs.
White clover	2 lbs.

Foothills—"Brown top" country—

Perennial Rye	30 lbs.
x Crested dogstail	3 lbs.
Montgomery red clover	4 lbs.
White clover	2 lbs.

Better class "shingle" country—

Perennial Rye	10 lbs.
Cocksfoot	12 lbs.
White clover	2 lbs.
Red clover	3 lbs.
Subterranean clover	2 lbs.

Light Shingle Country—

Perennial Rye	8 lbs.
Cocksfoot	6 lbs.
Subterranean clover	5 lbs.

x Optional.

xx Omit red clover if white clover seed saving is a regular farm activity.

Time and Method of Sowing

Grass seed may be sown under our varying soil and climatic conditions in the spring, in late summer and in early autumn. Spring sowing is suitable on the plains where the land is not liable to excessive drying out in mid-summer or where summer rainfall is fairly certain, as in the foothill area. Late summer and early autumn sowings, particularly on fallowed land, are usually successful. Late autumn sowing is risky as early frosts can cause a high death rate amongst the young seedlings—particularly the clovers.

Method of Sowing:

On medium and good soils broadcasting on a rolled surface is the most satisfactory method for grass seed and if heavy harrows are not used it serves for clover seed also. The latter seed must not be buried deeply and should be covered by either a second rolling or by the use of a light covering harrow. On light and less fertile soils more certain establishment may be obtained by shallow drilling of the grass and clover seeds. As this method leaves the plants in rows and results in bare spaces in the turf, a compromise method may be adopted so that the seed falls from the grain outlets of the drill—part of the seed going through the coulters while part falls directly to the ground.

The mixing of the seed with the manure is commonly done and has no ill effects on our main pasture species. With subterranean clover it is recommended that the seed be drilled with reverted superphosphate or a mixture of lime and phosphate in the early autumn. The drilling should be shallow—on a rolled firm seed bed.

Liming

There is ample evidence that the application of lime contributes greatly to the success of pasture establishment in Canterbury. Dressings may vary from half a ton per acre on the lighter plains land, 1 ton per acre on the medium clay soils to 2 tons per acre on the heavy clay "Brown top" country.

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

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