SEED PRODUCTION

N. L. SHILLITO

Farm Advisory Officer (Seed Production), Department of Agriculture, Christchurch

PRODUCTION

MID-CANTERBURY is the centre of the main small seed growing area of New Zealand and the purpose of this paper is to show how the growing of these seeds in particular, the seeds of herbage species relates to the general farm programme; what problems the seed trade is facing at present; and what might be done to improve the position.

The extent to which herbage seeds contribute to the total farm income depends on a number of factors, including soil type, rainfall, nearness to markets and, last but not least, the personal preference of the farmer.

Some prefer stock to cropping and will sacrifice grass and clover seed areas to maintain stock numbers. Some on the lighter land look on these crops as something they can expect only in good seasons when growth is such that a considerable surplus of feed results. Others again specialize in herbage seed crops and look on them as a major part of their cropping programme. They may even dispose of all their stock for a period and close every suitable area for seed.

The degree of importance growers attach to herbage seeds results in a wide range of efficiency in production.

The "occasional" grower who obtains a crop only in favourable seasons, tends to accept the limitations of his methods. He makes very little attempt to influence the quality of the seed and in many cases leaves the harvesting of the crops to somebody else.

On the other end of the scale is the regular grower, who might be considered a small seeds specialist, looking on every sowing of pasture seed as a possible cash crop. His management of the area aims at improving the potential of both the yield and quality of the seed. This may include fertilizers, spraying (with both insecticides 'and herbicides), even roguing, and certainly special harvesting techniques.

These different attitudes to herbage seed growing also account largely for the tremendous range of crop yields. One occasionally hears of ryegrass yielding 90 bushels of machine-dressed seed to the acre and white clover 5 sacks. Average yields are only about 30 bushels and 100 lb, respectively.

Why do these occasional high yields occur?

What are the limiting factors which prevent other crops from reaching these levels?

A few points seem worth investigating.

Has anybody really studied sowing dates? Is it better to sow ryegrass early to get plenty of grazing and encourage tillering; or would it be better to delay sowing so that the plants do not overdo the production of leaf at the expense of subsequent seed yield. It is known that, if cereals are over-grazed, lower yields must be expected. Could this be true for grasses?

Seeding rates vary. Do we really know the optimum quantity to sow? What gives the quickest bite of feed might not be best for a seed crop.

Have there been enough trials to establish the best time to apply nitrogen and how much?

Grass seed threshed out in the windrow by rain or hail can often be seen. Have the possibilities of early threshing and artificial drying been fully explored? The potential increase of yield with this system could give a very handsome return for a small outlay in drying.

What are the economics of growing herbage seed crops in the same way as wheat is grown? What yield would be needed to get the same return? Should this not be looked into more closely? Some of the main competition for overseas markets comes from areas where herbage seeds provide practically the whole farm income. Unfortunately, knowledge of these factors is very limited. A great deal more research is needed into problems associated with grass and clover seed production.

New Zealand's small seed trade has two main functions. First, it maintains adequate supplies of seed for pasture renewal and renovation within the country. Secondly, it supplements the national income by the export of seed overseas. An average value of statistics for total production gives a figure of about $8,000,000 for all seed produced while exports seldom exceed $4,000,000.

However, although exports represent only about half the total, they do in fact control the price structure for the whole trade, and prices paid to growers in New Zea-

land are a direct result of those obtained for seeds overseas. Thus, while the total value of seed exports may appear insignificant when compared with, say, the wool export cheque of about $154,000,000, it exerts a very significant influence on the economy of those farmers who grow herbage seeds.

At present the seed trade is going through a difficult period. For many years, New Zealand enjoyed a unique place in the world trade of herbage seeds. Plant breeders had made considerable advances in the development of improved pasture plants and the seed certification scheme made it possible to market a standard product of known origin and quality; no other country was in a position to do this.

Over the years other countries have become interested in the development of their own varieties of grasses and clovers. Not surprisingly, these are often better suited to their local conditions than are New Zealand varieties. These countries have profited by the New Zealand example and have not only started their own certification schemes but have also set higher standards than those in New Zealand, so much so that we have had recently to amend our scheme to meet standards set by O.E.C.D. Failure to do this would have prejudiced the sale of New Zealand seeds in traditional markets and restricted chances of entering other possible fields.

To offset the drop in demand caused by the development of these overseas strains and to maintain or increase export figures, there seem to be three possibilities open.

First, the sale of current varieties of grass and clover seeds could be promoted in those countries where they are known to perform satisfactorily. This subject has been given quite a lot of publicity recently and probably all are in general agreement that it is a reasonable proposition. However, it should be emphasized that, no matter how much publicity is given, if the price of the seed is not competitive, we cannot expect to sell it.

The second possibility is to look for new markets in developing countries which have a climate similar to that of New Zealand. This has already met with considerable success in South America. In many of these developing countries, the areas of land are extremely large and the seed requirements well worth some marketing promotion. A recent sale to South America has resulted in a very satisfactory reduction of stocks in this country so that the trade can look forward to starting the new season with comparatively empty shelves.

Finally, overseas varieties can be grown in New Zealand and the resultant seed re-exported. Opinions on this subject differ widely. Some think that this is one of the main prospects. Others say it would be the ruination of the seed industry. It is probably fair to say that both sides are right on some points. If a trade of this nature could be established, it would be on a contract basis so that growers would know what prices they would get for the seed before they sowed. However, this figure will be in line with world competition and is unlikely to be very high. The possibility still applies that, if growers in other countries prefer their own varieties, this could be the only hope of maintaining trade.

The dangers of this practice have been given a great deal of consideration. At present only grasses are permitted to be grown under 'this scheme. With New Zealand's present isolation requirements and previous cropping history, the chances of contaminating local varieties are slight. Furthermore, conditions regarding the ploughing of the area after harvest and the destruction of straw and seed dressing offals all help the position,

With clovers the position is not so straightforward. There are hard seeds to consider. These can affect the position in two ways. First, practically all areas suitable for clover seed production are very heavily contaminated with seed of New Zealand varieties. There is no proven treatment which would ensure the control of these seeds in the soil., The degree of contamination would probably result in the seed being unacceptable to the country concerned. Secondly, areas from which overseas varieties were harvested would also be contaminated, this time with hard seed of those varieties and the soil would be unsuitable for growing New Zealand varieties again for a considerable time.

Whatever methods are adopted to improve overseas trade in herbage seeds, the solution will not be easy. The problems must not be underestimated. The trade cannot be expected to be maintained unless a real effort is made to improve the position. The potential of some countries competing in the herbage seed trade is very great. Some individual growers in Oregon produce more seed than that handled by a major seed firm in New Zealand. These growers dress the seed on the property and their whole production is geared to produce a high-quality product at a low price.

The main factor in the success of any venture is price and if New Zealand cannot compete in this field, overseas

trade can be forgotten. What, then, can be done to produce cheaper seed?

Increased yields are an obvious factor. It has already been suggested that a lot more work is needed on this aspect.

The chances of reducing costs must be examined carefully. Machine-dressing charges are a major part of the cost structure and are based to give a margin of profit to the firm over all lines. A lot of seed goes into store in a pretty rough state. Dressing losses of over 50% are not unheard of. This means that the grower who is sending in high nurity lines with low dressing losses is being penalized to cover the cost of cleaning lines which, if costed separately, would be quite uneconomic. Without doubt these charges could be reduced substantially if all seed going into store for dressing was of a high purity.

Cleaner seed in the paddock must be the aim, and high nriority for research into this subject is advocated. Many factors need consideration-sprays (including pre-emergence to control volunteer plants), rotation and harvesting. It must be possible to improve the position.

Handling charges and bulk storage are other factors which must be examined, and there seems every chance of the whole position being given a new look.

In closing, it seems appropriate to quote from an article in the American publication, ***Seed World,*** of March 22. 1968. This was a talk given by Jesse E. Harmond, head of small seed harvesting and processing investigations of the Agricultural Engineering Research Division, U.S. Department of Agriculture. He was discussing development and nosed the following possibilities in the near future. He said :

"Let us now project some of these developments into the seed industry of the future. Soil may be prepared and pre-emergent weed control applied. With a precision planter, 100 per cent perminable seeds will be planted equidistant from each other. Selective sprays for weed and fungus control then will be applied periodically with irrigation water from an underground sprinkler system that is automatically operated by a moisture sensing device located in the plant-root zone. The uncultivated crop will be harvested at the optimum seed moisture so that the maximum quantitv of high quality seed will be saved,

"The harvested seed will be analysed for purity, germination, dimensions, and other physical properties. Then this information will be fed into a computer which will catalogue the seed and indicate the processing procedure.

The procedure will describe the machines and the order in which they are to be used, as well as the size and shape of screen or indent to use, in order to save the maximum quantity of nure seed.

"The clean seed will be bulk-stored in self-cleaning tanks through use of a push-button controlled handling and storage system which is automated and interlocking. The pertinent information as to variety, weight of seed lot, purity, and germination will be placed on a punch card. When the seed is sold, the computer will select the proper seeds lots and indicate the buttons to push so that the stored seed will be automatically delivered to the scales. En route, the seeds will be subjected to radio-frequency waves to kill insects, reduce hard seed, and improve the water-absorbing ability. They will be sub--jected also to irradiation to kill bacteria spores, and to electrical waves that will determine and record seed germination.

"Some of these ideas may seem way out but so did sending a man into space. I am confident that a team of research scientists assigned the specific job, furnished the necessary funds, and using equipment already available, could develop a system similar to the one indicated."

DISCUSSION

Answering a comment that premature cutting of ryegrass seed crops might induce low germination, Shillito said that he had not meant to advocate premature cutting but rather to shorten the time between cutting and threshing, which would reduce losses of valuable seed. He thought that early cutting would probably increase dressing losses rather than cause low germination, unless the cutting was extremely early.

An inquiry was made concerning protection of New Zealand seed export trade from practices such as that of Oregon growers selling 'Apanui' cocksfoot. Corkill replied that this had been going on for years and could, in fact, probably be regarded as a compliment to our plant breeders. There could be no control over such practice unless Oregon growers tried to certify New Zealand varieties under the O.E.C.D. scheme, when restraining action could be taken.

Following a question of whether small seeds would be produced from single-purpose crops as suggested or from dual-purpose crops as at-present, Shillito said it was not possible to be sure of the ultimate result. Much, for instance, would depend on prices, but he did feel some changes were needed. It might be necessary to regard lower grades as mass-produced blends of the higher grades. This would mean paying much more attention to the latter, perhaps as single-purpose crops.