

Securing High Yields and Avoiding Losses in Ryegrass Seed Crops

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PREVIOUS bulletins in this series have dealt with different aspects of small seed production. They will be referred to in the appropriate sections of this bulletin which deals specifically with problems concerning the ryegrasses. New Zealand ryegrass seeds have earned a high reputation on the export markets of the world during and since World War II but now other countries are entering the export trade and competition is becoming keen. The quality of our seeds is unquestioned but the price per pound must be kept to as low a figure as possible if we are to maintain the overseas market. One of the ways in which this can be effected is to secure high yields per acre and to improve the efficiency of our harvesting methods so that losses of seed are reduced to a minimum.

Methods of increasing yields:

The majority of ryegrass seed crops are taken from pastures which are primarily established to provide grazing for stock. Such pastures are commonly sown on an autumn fallow, they provide some grazing in the late autumn, winter and early spring. Then they are closed for seed if the feed position on the farm will allow. The highest yields per acre are usually obtained from these first year crops. Seed may be taken however from pastures which are two to four years old but the yields are usually considerably reduced.

Once the pasture is established and the essential lime and phosphates have been applied there are two practices which can be applied to increase yields of seed.

(a) **Early closing.** In the days be-

fore the introduction of the header harvester, when the crop was cut with a binder, stooked and later threshed from the stook, it was the aim to produce a crop which was not too bulky, and which stood upright for easy cutting with the binder. As a result farmers learned by experience to close their fields at specific dates—say early in September on the lightest soils, early October on the medium soils and early in November on the heaviest soils. Crops so treated were not particularly heavy but they were easily handled with the binder. Since the header harvester became the standard method of threshing, the mower has become the standard method of cutting. It

can handle bulky and lodged crops without difficulty. Bulky crops produce the highest yields and even though they lodge this does not seem to impair seed production. Early closing encourages the development of bulky crops and the production of higher yields. Some growers on the light and medium soils do not graze the crop at all in the spring, but on the heavy soils a light grazing in the spring is probably necessary to prevent lodging before the seed heads are formed. In general, however, crops can be closed from four to six weeks earlier than was the established custom ten or more years ago.

- (b) **Application of Nitrogen.** Nitrogen is one of the essential nutrients required in large quantities for grass growth. In grazing pastures liberally supplied with lime & phosphate and managed to encourage the growth of clovers, the grasses get the greater part of the nitrogen from the clovers and from the dung and urine of the grazing animals. But in seed stands the clover is often suppressed and the nitrogen from dung and urine is excluded. Hence artificial supplies of nitrogen are often necessary to encourage bulky growth of the grasses. Sulphate of ammonia has been used for this purpose for several years with some success. More recently nitro chalk or nitro lime has been recommended and supplies of this fertiliser are coming into New Zealand. At present prices an increase in yield of one to two bushels per acre will pay for the cost of one hundred-weight of nitrogenous fertiliser. Experimental results have indicated that increases up to 100 per cent are possible depending upon the nitrogen status of the soil. As a general recommendation, at least one, perhaps two, hundred-weight of the nitrogenous fertilisers should be applied to all ryegrass seed stands which show any signs of backwardness in the early spring.

Methods of reducing losses:

Losses associated with harvesting may be concerned with the quality

of seed or the quantity of seed. Losses in quality are usually associated with disease and weeds. Losses in quantity may occur before cutting, after cutting, during threshing or after threshing. Unless the grower is fully aware of the significance of what appear to be small losses at all these stages and takes steps to reduce them, he may often incur a large total loss. To emphasise the magnitude of the losses in quantity one only needs to realise that one bushel per acre on the ground represents about one ounce per 15 square yards or less than one seed per square inch.

Losses in quality:

(a) **Disease.** Blind seed disease of ryegrass has become a major problem in most seed growing areas. Investigations have indicated that the land becomes infested by sowing diseased seeds or by diseased seeds falling to the ground in the autumn. In the spring when the ryegrass plants are flowering the diseased seeds on or in the ground produce tiny, pale pink, pin-head like growths which produce the spores of the disease. These spores are air-borne and are deposited on the open flowers where they infest the developing seeds. In humid or damp weather they are produced in large quantities and the infestation may assume epidemic proportions. In dry seasons, however, spore production is restricted. In a thin crop the air-borne spores readily infest open flowers, but in a bulky or a lodged crop the spores are trapped to some degree beneath the crop and the infestation may be less. To some extent then the practices advocated for increasing yields—early closing and application of nitrogen—will help to reduce blind seed disease.

Fields which are free from the disease through being sown with healthy seed may become infested by spores produced on diseased plants in or outside the field. This source of infection may be reduced by cutting adjacent ryegrasses before flowering. This can involve cutting a strip a chain or so wide in an adjacent ryegrass field, cutting ryegrasses in corners and perhaps round the headland and cutting ryegrasses along roadsides. These practices are recommended as an attempt to keep a disease-free-field free from infection as far as possible.

(b) **Weeds.** Weed seeds are not often a major problem in the first year stands particularly when pre-

reduce the risk of heavy losses in the cautions have been taken to clean the land prior to sowing, but they may be in older stands. There is little one can do to reduce the weeds in the growing crop. Spraying may be advisable if a thick strike of a specific weed is likely to prove troublesome and is recommended to prevent Californian thistle from producing seed. Most of the common herbaceous weed seeds can be dressed out of the line by machine dressing. Some of the grass weeds—hairgrass and goose grass—are the most troublesome. Where they are present, care must be taken when threshing not to remove the awns or wings of these seeds. If they have been removed by hard threshing, it is almost impossible by machine dressing, to produce a line up to the required standard of purity, which is generally 98 per cent. When goose grass infests a stand it can be controlled to some extent by cutting the field for hay before the goose grass seeds mature. The plant is an annual and if reseeding is thus prevented, the weed dies out. It is difficult, however, in practice to prevent some reseeding.

Losses in quantity:

(a) Time of cutting. Under average conditions ryegrass seeds do not mature at one time. The grower must judge when he considers the majority of the seed is mature. If he cuts too early some of the seed will fail to fill or will shrivel after cutting and if he cuts too late some of the seed will have shaken out. Fortunately in most seasons there is a range over two or three days when the crop is at the ideal stage for cutting. This stage is judged by drawing the heads through the hands. When a few mature seeds fall out cutting can proceed. An alternative method is to sweep a hat across the heads and if a few seeds collect in the hat, again cutting can proceed. In hot dry weather and on light land the seed may mature quickly and evenly and the crop may even approach a state suitable for direct heading.

(b) Methods of cutting. Here growers are referred to Bulletins Nos. 186 and 228 where the techniques of setting the mower, cutting with the mower and windrowing with the binder are fully discussed. The main problems with a bulky or a lodged crop are to avoid making too big a windrow by cutting a 6ft or 7ft swath instead of a 4ft or 5ft one.

Remember the swath must be laid so that it dries out quickly and evenly and must be capable of being handled by the header harvester. The swath should be evenly laid and the heads placed uppermost. In a lodged crop a "goose neck" on the outside divider makes cutting simple. A long outside swath board is sometimes useful in heavy crops and for medium to light crops the use of the additional inside swath board is valuable to bunch the swath.

(c) Handling after cutting. Once cut ryegrass gets dry, the seed shakes out very readily. Even rain and wind will cause a lot of seed to shake out. Some growers continue to cut Italian ryegrass and H1 ryegrass with the binder and to stook the cut crop to windrow. As far as possible then the swath should not be touched till it is ready to thresh. Should the weather cause slow drying and growth of herbage through the swath it is possible to condition it for threshing by cutting under the swath with a mower; alternatively if advantage can be taken of cool humid conditions a crop aerator may be used to lift and replace the swath. It is surprising how quickly a swath so treated will condition for threshing.

Ryegrasses thresh so easily that threshing is sometimes commenced two or three days after cutting. The seed is not then dry but is placed in approximately bushel lots in manure bags and hung on fences to finish conditioning. This practice greatly reduces the risks of loss while in the windrow but involves extra labour.

(d) Threshing. The problems connected with this process are dealt with in Bulletins Nos. 185 and 234 and growers are referred to these issues for full discussions. The first consideration is to be sure that the swath is in condition for threshing. Unless the seed is to be hung on fences in small lots as just described it must be thoroughly dry before threshing otherwise it will heat or go mouldy in the sacks. Ryegrass threshes very readily and the header drum should be set just sufficiently close to remove the seed from the heads. Threshing harder than necessary will bruise and crack seed and will remove awns and wings from weed seeds and thus make separation in machine dressing difficult. Constant attention must be given to adjustments throughout the day in keeping with changes in the condition of the crop. Care must be taken to see that all seed is threshed from

the heads and that no good seed is discharging from the machine.

Conclusion:

Yields of ryegrass seed can be increased by growing bulky crops, through early closing and by nitrogenous topdressing. This practice has the additional advantage that it tends to reduce infection by blind seed disease. Having produced a bulky crop, losses of seed can be reduced by cutting the crop at the right time, by cutting a swath which is not too large to dry out readily, which is evenly laid with heads upwards and which is suitable for the particular type of header harvester to be used. A "goose neck"

on the outside divider, a long outside swath board and a narrow cutter bar facilitate handling of bulky, lodged crop. The cut crop should not be handled after cutting unless absolutely necessary. If the swath is drying too slowly or if growth is appearing through it, it may be undercut or lifted with an aerator when the conditions are cool and humid. The seed should be dry before threshing and threshing should be thorough but not too hard. Ryegrass seed has a high value per pound and the observance of these simple precautions is well worth while if a few extra bushels or pounds per acre are secured.

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