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# FARM SEEDS

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There is no Seed Act governing the sale of farm seeds in New Zealand. The purchaser relies on the merchant to supply him with high quality seed. The fact that it is only rarely that disappointing results are obtained is a tribute to the organisation of the Seed Industry in New Zealand. The Agricultural Department provides two services which have been instrumental in achieving the high standard.

The first is that provided by the Seed Testing Department which, on analysis of samples, provides certificates giving the purity and germination of the sample. Merchants utilise the services of the Seed Testing Department extensively and on the results of the analysis are able to buy and sell seeds on a guaranteed basis. Farmers could make greater use of the service when purchasing seed, either by requesting merchants to supply a copy of the purity and germination certificate or by forwarding a sample to the Seed Testing Department on their own account. In this way they would avoid the occasional failures and disappointing results which accompany the sowing of low germinating seed or seed containing undesirable weed seeds.

The second service which is available for certain kinds of farm seeds is that provided by the Certification Scheme. Lines of seed which have been certified are harvested from crops which have been inspected by departmental officers. Certain standards of purity and freedom from disease are established for the different classes of seeds, but more important than this is the fact that there is a guarantee that crops grown from certified seeds are of the type indicated on the certification tags on each sack of certified seed. This service has been of outstanding benefit to purchasers of Perennial Ryegrass

and White Clover, but it is also operating with Italian Ryegrass, Cocksfoot, Brown Top, Phalaris Tuberosa, Montgomeryshire Red Clover, and with wheat and potatoes.

It must be understood that the fact that a line of seed is certified does not necessarily mean that the seed has a high germination or is free from weed seeds. It is certified only as to type. But for all lines of certified seed purity and germination certificates are available and purchasers should examine these before making commitments.

When assessing the value of a line of seed, the points to which special attention should be given are as follows:—

1. The Age of the Seed.—Except in a few instances, seed which is more than one year old has a lower germination and a lower germination energy than one-year-old seed. Farmers may have occasion to use seed which has been carried over from one season to another and it is useful to know how long it will keep before it becomes useless. The following list will give some idea of how long seed can be kept. These figures are not absolute because the reduction in germination on storage depends on the state of the seed when harvested, and the conditions during storage. Well-matured seed stored under cool, dry conditions can, however, be expected to behave as indicated in the table.

	Per Cent.		
	Germination		
	1st.	3rd.	5th.
	year	year	year
Red Clover .....	97	97	48
White Clover .....	83	80	61
Lucerne .....	91	93	79
Perennial Ryegrass .....	92	89	67
Italian Ryegrass .....	83	79	57

Cocksfoot	90	88	77
Dogstail	63	33	5
Oats	84	81	59
Wheat	92	87	74
Mangel	84	88	92
Turnips	98	98	98
Peas	87	90	90

2. Vitality of the Seed.—This is measured by the speed of germination and it gives an indication of the vigour and capacity to establish in the field. Seeds with a high vigour have a greater chance of withstanding weed competition. The vigour is indicated on the purity and germination certificates by the percentage germination after the test has been in progress some days less than that required for the full germination. This is a most important indication of good or poor seed. A sample of seed may have a fair to good final germination but may be low in vigour. It is in this respect that total germination figures for old seed are likely to be unreliable. Under this heading we can also mention that certain seeds must undergo a period of rest after harvest before they will germinate fully. New season's Algerian oats are known to be unreliable when sown in the autumn following harvest, but will germinate satisfactorily in the following Spring. Phalaris tuberosa also has a low germination in its first year, but it is satisfactory in the second year.

3. Germination.—When seed is harvested in good weather and the crop has been allowed to become fully mature, the germination is usually satisfactory. But even when harvested under good conditions some kinds of seed have low germination. It is more common, however, to experience low germination in the seed from crops which are harvested before they are fully ripe. Low germination is also experienced when the harvesting weather is wet and when the seed is stored in a damp condition. While there are no fixed standards for the different crops, the following list gives an indication of a fair average standard germination for machine dressed seed in New Zealand:—

Wheat 92%+; Oats 80%+;  
 Barley 95%+; Tares 70%+;  
 Lupins 60%+; Linseed 95%+;  
 Turnips and Swedes 80%+; Rape  
 90%+; Mangels 80%+; Carrots  
 65%+; Red Clover 90%+; White  
 Clover 80%+; Subterranean Clover  
 80%+; Lucerne 80%+; Ryegrass  
 95%+; Cocksfoot 80%+; Dogstail  
 90%+; Timothy 90%+; Dan-

thonia 50%+; Paspalum 70%+;  
 Phalaris Tuberosa 70%+.

It is not usual for wheat seed to cause any trouble on account of low germination, but during the past year or two several lines of seed have failed to germinate well. This can probably be accounted for by the fact that harvesting conditions were bad and the seed was probably stored in a damp condition. Seed driers could be used to correct the ill effects of bad harvesting conditions. They are used extensively in countries with less favourable harvesting conditions than are usually experienced in New Zealand.

Other seeds that are likely to have low germination are:—Phalaris Tuberosa (already mentioned); Lupins which are frequently harvested on the green side to reduce loss from shaking; Dogstail which is also harvested in an immature state to secure a high proportion of light-coloured seed; Foxtail which is often infected with the Foxtail midge; Cocksfoot of recent years has developed some insect or fungus disease associated with low germination; Perennial Ryegrass in wet and cold harvests, such as occur in southern districts, is infected with a fungus disease which in certain seasons is liable to reduce germination to very low figures. The germination in Canterbury in 1937-38 season was also very low, probably as a result of unfavourable harvesting conditions.

In addition to these specific instances, all seeds harvested in an immature state, or harvested in wet weather, or stored in damp condition, are likely to have low germination.

In the clovers, the presence of "hard seeds" results in a lower germination. These are seeds which do not absorb water readily and remain unaltered on the germinating plates. The proportion of hard seeds varies with different clover from about 0 to 20 per cent. When sown they germinate later than the main sowing and may prove useful where early frosts cause death of autumn sowings.

These instances of irregularity in germination illustrate the importance of ascertaining the germination of all kinds of farm seed before sowing if costly failures are to be avoided.

Testing for Germination.—The germination percentage of any line of seed is best obtained by forwarding a small sample to the Seed Testing Station of the Department of Agriculture at Palmerston North. An

official germination certificate is issued on payment of a small fee. A certificate of purity can also be obtained if desired. This is the most reliable method, but a grower can make the test himself by counting out 100 seeds of the line to be tested and placing them in 10 rows of 10 each on damp blotting paper in a saucer. Keep the blotting paper damp, cover with another saucer and place in a warm position, such as the kitchen mantel. A count of the number of seeds which germinate will give the approximate germination percentage of the line.

4.—Purity.—The value of a sample of seed is often affected by the nature and quantity of impurities present. Impurities include inert material such as chaffy matter, empty husks, broken seed, seeds of other crop plants, and weed seeds. These impurities reduce the value of the sample by the proportion present, but more particularly by the presence of injurious weed seeds. Most farm seeds purchased from merchants are machine-dressed and it is only in a few instances that machine-dressed seed with a purity of less than 98 per cent is offered for sale. Machine-dressed cocksfoot averages about 75-80 per cent purity owing to the presence of inert matter such as empty husks, broken straw, etc., and other grass seeds. Machine-dressed clover averages about 90 per cent purity owing to the presence of Little Trefoil. But as previously mentioned, it is not the quantity but rather the nature of the weed seeds which is the important consideration. It would matter little if a sample of Ryegrass seed contained a few per cent of sorrel, ribgrass, hairgrass, or goose grass. But if it contained even one-hundredth of 1 per cent of Californian thistle or other injurious weed, it may be the cause of introducing these weeds to the farm.

A sample of grass seed which records 0.1 per cent of the following weed seeds will contain, on an average, 500 seeds of Californian thistle 1000 seeds of Ragwort, and 1200 seeds of Ox-eye Daisy, per pound. If 30lbs. of grass seed is sown per acre the number of weed seeds sown will approximate 20,000, or 5 per square yard.

Californian thistle must be looked for in Perennial Ryegrass, Dogstail, and Timothy; Ox-eye Daisy in Fox-tail, Alsike, and Yorkshire Fog; and Ragwort in Brown Top, Lotus Major and White Clover. Greater precautions must be taken in regard to these injurious weeds, when it is

known that the seed was harvested in districts where the weeds are prevalent. In the case of clovers and lucerne, care must be taken to avoid samples in which even a trace of Dodder is present.

While for general farm purposes the presence of common weed seed and seeds of other crops will not affect the value of the sample other than by a proportionate reduction in price, it does affect the value where it is intended to sell certified seed from the resultant crop. Extremely high standards of purity are demanded in the case of pedigree cocksfoot, where a small percentage of ryegrass in the seed sown will give a much higher percentage in the first year's crop and cause the line to be rejected for certification.

Bushel Weight.—The true bushel weight of a sample of seed indicates the weight of a certain volume of the seed. Seeds which are well matured, which are well filled and from which excess of chaffy material has been removed during harvesting or machine dressing, will weigh heavily, and the true bushel weight indicates the quality of the seed in respect of these characteristics. The range in true bushel weight for various kinds of seeds grown in New Zealand is as follows:—Wheat 58-68lbs. (F.A.Q. Standard 1937-38, 62lbs); Oats 40-60lbs; Barley 50-60lbs; Peas 65-68lbs; Maize 65-68lbs; Perennial Ryegrass 15-32 lbs; Cocksfoot 5-20lbs; Dogstail 26-36lbs; Timothy 45-50lbs. The true bushel weight is one of the common standards used by merchants in purchasing these seeds.

The standard bushel weight has no direct relation to the true bushel weight but is a convenient quantity of seed on which sales and purchases are made instead of by the pound or hundredweight. It also varies for different classes of seed. In New Zealand the following kinds of seed are sold by the standard bushel weight:—Wheat 60lbs; Oats 40lbs; Barley 50lbs; Peas 60lbs; Tares 60lbs; Maize 56lbs; Perennial Ryegrass 20lbs; Italian Ryegrass 20lbs; practically all other farm seeds are sold by the pound.

Real Value.—By this term is meant the percentage of pure and germinating seed present, and it is obtained by multiplying the percentage purity by the percentage germination and dividing by 100; e.g. a line of cocksfoot with 70 per cent purity and 80 per cent germination has a

$70 \times 80$

real value of  $\frac{\quad}{100} = 56\%$ . If two

lines of cocksfoot are quoted for sale it is possible to compare their value by using the "real value"; e.g., one line of cocksfoot with a germination of 80 per cent and purity of 70 per cent is offered at 1/6 per lb. and another with a germination of 70 per cent and purity of 70 per cent at 1/3 per lb. The former has a "real value" of 56 per

cent. Therefore, — of  $\frac{100}{56}$  of 18d.=32.1d.;

which is the price per lb. of pure germinating seed. The latter has a "real value" of 49 per cent. There-

fore — of  $\frac{100}{49}$  of 15d.=30.6d. which is the

price per lb. of pure germinating seed. The latter is the cheaper line, other things being equal.

Staining Imported Seed.— The Seed Importation Act of 1927 and 1929 was introduced for the purpose of protecting the New Zealand farmer against the importation of inferior strains of certain grasses and clovers. It requires that not less than 1 per cent of all imported cocksfoot and not less than 10 per cent of all imported white clover and lucerne are to be stained red. A farmer can then recognise at once that the seed is imported and can proceed to make further enquiries before he purchases it.

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