



GOOD SEED OF CEREALS AND ITS SIGNIFICANCE

CANADIAN farmers will seed over eighty million bushels of cereal grains next spring, and the yield and quality of the crop harvested will be determined to no small extent by the character of the seed used.

Good seed has certain definite characteristics. First of all, it must be of a variety suited to the climate and soil of the farm on which it is to be grown. It should be pure as to variety and kind, and be free from weed seeds. It should also be free from seed borne diseases and have the vitality necessary to produce a healthy, vigorous plant.

In view of the important bearing of good seed on crop production, each farmer should ask himself: "Is my present variety entirely satisfactory for the conditions peculiar to my farm? Is my seed as pure and as strong and vital as it should be? Can it be cleaned and made into first-class seed?" If there be any doubt as to these things, he should take the necessary steps as soon as possible to rectify them. The seed problem is entirely within the control of the farmer.

Choice of Variety

Yield per acre, quality, disease resistance, length and strength of straw, and length of growing season are prime considerations in selecting a variety.

Many are inclined to look to high yielding ability as the chief characteristic to consider in choosing a variety. In the case of western grown wheat, however, the matter of quality for bread-making purposes also must receive careful consideration. Canada faces strong competition in the world's wheat markets but occupies a strong position therein as a result of the high quality of her product. This position must not be jeopardized in any way.

Specific recommendations as to the suitability of certain varieties for any given district in the Dominion are submitted in another publication.*

* Best Varieties of Grain, Pamphlet No. 156.

Published by Authority of HON. J. G. GARDINER, Minister of Agriculture, Ottawa.

Devastating epidemics of rust have brought to the attention of the farmers of Canada the tremendous losses which may occur through disease. Much work has been done in an attempt to breed varieties capable of resisting disease and as a result there are now available varieties of wheat and oats resistant to rust, and varieties of flax resistant to wilt. The use of these disease resistant varieties is strongly recommended.

Purity of Variety

Whatever variety is grown, it should be as free as possible from admixtures of inferior types. Every year, further evidence appears as to the losses sustained by overlooking this point. Data from almost any cereal variety test indicate that the better yielding varieties may outyield the poor yielding types by several bushels per acre. Obviously, the inclusion of lower yielding varieties as mixtures in the variety sown will affect the ultimate yield.

Wheat when marketed, especially in Western Canada, is officially graded and here variety again may be an important consideration. Thus, mixtures of varieties which require different lengths of time to ripen may produce both over-ripe and immature or greenish kernels. This situation may entail a loss in yield by shattering, as well as a loss in grade. Uniform ripening is particularly important when the combine is used. Mixtures which include non-acceptable varieties are liable to be penalized. These varieties are debarred from the top grades because of inferior quality. Unless varieties are officially declared to be the equal of Marquis in quality, they cannot be accepted in these higher grades. Another source of loss in grade is the inclusion of sweet clover in the growing wheat crop. The odour from sweet clover is very penetrating and when wheat is grown with sweet clover, the odour may taint the wheat. This is now termed "melilot taint" on wheat. All wheat with melilot taint is now graded "rejected" from the grade to which it would otherwise belong. Such wheat sells at present, at a discount of about eleven cents under the straight grade. It is therefore recommended that every precaution be taken to eliminate volunteer plants of both seedling and mature sweet clover in wheat fields. In barleys, no six-rowed variety will be accepted in the malting grades unless it be equal in malting quality to O.A.C. 21.

Cleaning and Grading Necessary

All seed requires a thorough cleaning and grading to remove weed seeds and offal as well as all light and shrunken kernels. There is a definite relationship between plumpness of the seed and size and vigour of the young plants produced. Drought and rust frequently produce much shrivelled seed which in turn produces smaller and weaker plants. These weaker plants will be more dependent on favourable soil and climatic conditions to produce a satisfactory growth. Experiments indicate that the largest yield per acre may be expected from the use of large, plump, sound seed rather than from seed which has been poorly graded.

Improper cleaning of seed is due in most cases to lack of proper sieves or screens or to the improper adjustment of the mill. The ordinary fanning mill often may be adjusted to provide a sufficiently well graded sample under general farm conditions. It is impossible to give instructions for fitting and operating that will apply in all cases as different samples of the same kind of seed may require different treatment in the same mill. Some of the weed seeds are difficult to separate, but most of them can be removed if proper sieves

are used and time is taken to determine the proper combination of size and slope of sieves, shake, air blast and rate at which the grain passes over the sieves. Specific instructions as to the sizes of screens to use in cleaning and grading seed of different kinds are given in Bulletin 137 (New Series), "Weeds and Weed Seeds with Notes on Seed Cleaning." This is available on application to the Publicity and Extension Branch, Dominion Department of Agriculture, Ottawa. Where certain impurities are present, one of the more efficient power cleaners may be required. A good power cleaner well equipped with sieves and screens can make finer separations and grade seed more uniformly than can a small hand-driven machine.

Germination

Only seed of high vitality will give a good stand of plants and a good stand is the first step toward a successful crop. Frost, immaturity, weathering, heating, moulds and other seed borne diseases are among the common causes of low vitality. Frost injury is apparent in wheat by a wrinkled or shrunken appearance, but is not indicated in oats or barley by outside appearance. Not only should a high percentage of plants be capable of germinating, but the vigour of growth as indicated by the number of seeds germinating in the first five or six days of growth should be high (85 per cent or more).

Satisfactory germination tests may be made at home by taking duplicate lots of 100 seeds each and planting them at proper depth in a box of soil or sand. The soil should be kept moist and at living-room temperature for about 12 days. The percentage and vigour of germination should be recorded after six days and the final count taken at the end of the twelfth day. This test should be made at least a month before seeding time in case it should be necessary to procure new seed. Low vitality seed makes good feed and should be used for feed rather than as seed. The vitality of all seed should be tested because grain that is plump and otherwise apparently of excellent vitality often proves to be quite too weak for seeding purposes.

Importance of Disease Free Seed

Good seed is healthy seed and many farmers do not realize the wide variety of diseases which may be carried by the seed. Smuts and certain root rots of cereals may all be disseminated by means of seed. The planting of infected seed practically ensures the perpetuation of the disease.

Plant diseases originate from three main sources, namely, the seed, the soil and the air. Air currents carry and spread the destructive causal organisms of most diseases. Our rust epidemics, which occur periodically, originate from air borne spores and can be controlled efficiently only by the use of rust resistant varieties. By using proper cultural practices, suitable crop rotations, and affording adequate drainage, a farmer can do a great deal to eliminate these diseases which are soil borne.

How then may he obtain disease free seed? Only by the most rigid measures and even then, only partial success may result. In the first place, the seed used for any crop should first be examined for disease. The Division of Botany and Plant Pathology, Central Experimental Farm, Ottawa, is equipped to conduct such examinations to a limited extent. If disease be found and it can be controlled by seed treatment, then the recommended treatment should be applied. We recommend the use of an organic mercury dust such as New

Improved Ceresan or Leytosan for use on cereal seeds to combat bunt of wheat, covered smut of barley, loose and covered smuts of oats and certain other seed borne diseases. When using commercial products for the treatment of seed, always follow closely the directions of the manufacturer. Resistant varieties, if suitable to the locality and available, should always be used.

During the growing season, crops should be inspected for the presence of disease. All diseased plants should be removed and burned. In the case of some diseases, the only practical method of control is in the use of a special plot well isolated and protected, solely for the production of disease free seed. This plot must be rogued mercilessly and often. The seed, when harvested, must be stored in clean, cool, dry surroundings. In short, the taking of every possible precaution which will prevent disease reaching and spreading through your crops is the way to healthy, disease free seed. Clean seed to start with, or treated seed, healthy growing conditions, resistant varieties, eradication of diseased material, suitable rotations and sanitary storage of seed, these are principles which, when rigidly applied every year, will help to produce disease free seed.

Registered and Certified Seed

"What seed shall I buy to be certain of *good seed*?" is a question which is frequently asked. To get a start with good seed, it is necessary to buy only a few bushels of Registered or Certified seed. These grades of seed are derived from crops inspected in the field and for which seed certificates are issued finally by the Plant Products Division, Dominion Department of Agriculture, Ottawa. These are legal grades under the Seeds Act of Canada. A variety is accepted for registration only after it has been carefully compared with other varieties and found to be deserving of a place in some part of the Dominion. Registration or certification of seed implies that the crop from which it has been derived must have been inspected in the field, and found to have the required degree of purity of variety and kind. It must also be free from weeds and seed borne diseases within certain limits. Furthermore, before the seed can be sold as registered or certified, it must be subjected to a purity and germination test and if up to a certain specified standard, is tagged and sealed in accordance with the regulations prescribed under the Seeds Act.

Prepared jointly by the Cereal Division, Experimental Farms Service, the Division of Botany, Science Service, and Plant Products Division, Production Service, Ottawa.