The Importance of Standardized Germination Methods in the Marketing of Sugar Beet Seed

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A standardized germination method for sugar beet seed testing is essential to efficent marketing and interchange of seed. A great deal of misunderstanding and expense could be avoided in the industry if a simple and effective testing technique were to be adopted by all laboratories concerned. The recommendations made under the Federal Seed Act have been adopted by most laboratories in the country.

The exactness of seed testing as a measure of the value of any given lot of seed is complicated by a number of factors. In the first place one may expect inherent variation in any plant material. This natural variation in seeds may be increased by conditions at maturity and harvest or by the technique of cleaning and blending. Assuming that the lot is of fairly even quality to begin with and that any blending that has been necessary has been done as carefully and thoroughly as possible, we still must draw a working sample of a pound or two of seed from several thousand pounds in the original lot. This working sample is then carefully mixed and divided until only 400 seeds are selected indiscriminately for use in determining the germination of the entire lot. If in addition to these factors each analyst develops an individual technique in determining germination, the results are likely to be confusing to say the least.

A number of years ago the government took over the responsibility of seed inspection in an effort to improve the quality of seed for sale. Laws were passed concerning the proper labeling of seed as to purity and germination and requiring that it be free from certain noxious weeds. For the enforcement of these laws it was found necessary to set up laboratories and develop laboratory techniques for determining the purity, germination, and noxious weed content of seeds which came under their observation. During the years that followed the correlation of individual and federal research led to a definite recommendation of procedure in making laboratory tests on seed. When the new Federal Seed Act was adopted several years ago there were accompanying methods of testing for the enforcement of the act. These rules were drawn up with the greatest of care and were formulated, checked, and approved by both the commercial and official seed-analyst associations. These rules are

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amended from time to time as it seems necessary. The federal government has urged that all laboratories follow these procedures as closely as possible so that a measure of uniformity may be achieved in complying with and in enforcing the law. Sectional schools are conducted each summer and a representative from the Washington laboratory is present to help analysts arrive at uniform interpretations of laboratory tests. In addition, photographic plates have been made showing normal and abnormal types of sprouts which may occur in the germination tests of various kinds of seed. Referee tests on different seeds are out regularly to all members by both analyst associations for experiment and regular test. The results are published so that participants may compare their work with others and benefit by the discussions and recommendations made by the research committees.

These efforts toward the development of uniform results in seed testing are important to the seed trade so that it may have reliable information for buying and selling seeds as well as fair judgment from law enforcement officials.

I believe that all organizations should strive to follow the rules and regulations for seed testing as they have been set forth by federal authorities. If it is found that these rules are impractical or unfair, the matter should be brought to the attention of the official seed analysts' research committee and changes recommended through the proper channels so that difficulties will not arise through lack of uniformity in methods used in different laboratories.

It is our experience and belief at the Ransom Seed Laboratory that the present official method of testing beet seed is efficient and practical as well as consistent in result. It consists, as you know, of testing 400 seeds. These are soaked in tap water at room temperature for 2 hours. They are then drained and put between saturated germinating blotting paper and placed on. trays in a germinator thermostatically controlled to maintain a temperature of 30° C. for 8 hours and 20° C. for 16 hours. The time for the test is 14 days. Retests shall be made if there is a difference of 10 percent between any two of the separate hundred seeds tested when the average of the tests is 80 percent or above, and if there is a difference of 15 percent when the average is below 80 percent; otherwise, the average of the tests shall be. considered the result of the test.

At the Ransom Seed Laboratory we have found that 100 seeds may be soaked in a 100-cc. test tube. At the end of 2 hours these are drained into a strainer, rinsed under the tap, and blotted on a paper towel to remove the excess moisture; then they are arranged between

folded blotters. Counts are made at 3, 5, 7, 10, and 14 days. Most of the germination has occured by the sixth day.

We have periodically participated in tests submitted to different laboratories from the same sample and have found the results satisfactory when all laboratories concerned use the official method. Tests were made in this manner with the California state laboratory over a 2-year period involving several hundred tests. The average for each year varied less than 3 percent, and less than 10 percent of the individual tests varied more than the allowable tolerance which are as follows:

	Tol.		Tol.
96 or over	5	70 or over but less than 80	8
90 or over but less than 96	6	00 or over but less than 70	9
80 or over but less than 90	7	Less than 60	10

In conclusion, we would like to recommend that the Association of Sugar Beet Technologists adopt the official method of testing sugar beet seed.

Standard Methods of Laboratory Germination of Sugar Beet Seed in Canada

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In Canada seed traffic and merchandising are rigidly controlled by federal statute. Until the last decade almost all sugar beet seed used in Canada was imported from Europe, and consequently purity standards have been established to which strict adherence is maintained.

Laboratory Methods For Regular Seed

Screening.—A seed sample presented for germination may be screened over a screen of 2-millimeter mesh to remove light dust.

Soaking.—Four samples of 50 seeds each are then selected and each sample is set to soak in a separate aluminum cup containing at least 50 cc. of tepid water. The first water is changed after soaking approximately three-quarters of an hour; and thereafter the water is changed every hour throughout the soaking period which must be at least 3 hours but not more than 6 hours. After soaking, the seed is thoroughly drained over a wire mesh before planting.

Planting.—Each sample is planted between blotters and germinated at a temperature of 20° to 30° C. The temperature is allowed to rise gradually in the morning and fall gradually at night, one complete cycle being made each 24 hours. The blotters used are prepared specially and are meant to be free from active nitrogenous or sulphurous substances.

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