

Purity and Germination

Methods and Tests to Determine Quality of Agricultural and Garden Seeds.

(The following is the second installment of an article on the "Purity of Germination" of agricultural seed tested by the North Carolina Department of Agriculture and is taken from Bulletin prepared by Prof. O. I. Tillman, Botanist of the Department:)

The Germination Test.

Not less important than avoiding impure seeds is the avoidance of seeds having low or no vitality, which fact can be determined only by the germination test. An illustration of the difference in the germinating quality of seeds found on the open market is shown by the illustration on the cover page, of two germination tests of cowpeas. These tests were made at the same time and given identically the same condition; in fact, the tests were placed side by side in the germinating chamber. In case of one sample there was no germination, while the other germinated 100 per cent. Between these two extremes there are all grades of seeds having high or low germination, and this is true of all the different kinds. As it is possible to obtain good high-grade seed, no farmer should be willing to take the risk of purchasing seed whose germinating quality he did not know nor be satisfied with only a fair-grade seed. Partial or total failure of crops is often due to no other reason than that the seed planted will not grow.

At the laboratory the germination tests can be made somewhat more accurately, as with the germinating chambers the seeds can be given the temperatures most favorable for their growth. Kentucky blue-grass and a few other grasses are given special conditions; they are grown under small glass bell jars and the seed-bed is kept saturated by means of a wick extending from a piece of cotton flannel cloth placed under the blotting paper upon which the seeds are germinated down into a tray of water; but in case of the majority of seeds the germination test can successfully be made at home.

The sample should be mixed thoroughly, then 100 seeds counted out just as they come, no selection being made. These should then be placed, not touching, on moist cotton flannel cloth or blotting paper between two dinner plates. The seeds should be kept at room temperature or at about 70 degrees Fah. Seeds which sprout quickly are more vigorous than those which take a longer time, and it is, therefore, advisable to make at least two counts of the sprouted seeds, as by doing this the per cent of vigorous seeds can be determined as well as the total per cent that will grow. It is well to make the first count at the end of half the time given the entire test. All good seeds will have germinated in the length of time given for the test in the germination table, page 40. The number of sprouted seeds indicates the per cent of seeds that will grow under favorable conditions.

The cotton flannel cloth used as a seed-bed is torn into strips about the width of a dinner plate and four times as long. It is then doubled once and the seeds placed on half and the other half doubled over them. By folding it in this way it gives a double thickness and retains the moisture better. The cloths should be sterilized by boiling and allowed to cool before using. Blotting paper folded in like manner is also satisfactory, especially for the smaller seeds. Care should be taken that the seeds

are kept moist, but not wet, as too much moisture is more injurious than not enough.

Submitting Samples.

When sending seed to be tested it is important that the sample fairly represents the bulk from which it is taken. It would be helpful in securing an accurate sample if the following directions were followed: The contents of the package, bag, or barrel should be mixed thoroughly with the hand and arm; take several handfuls from various parts of the package, top, middle, and bottom; mix these well together and take a part of this mixture for the sample. For a fair sample the following amounts of the various seeds should be sent: of the smaller seeds, like red-top, timothy, and red clover, about four tablespoonfuls is a sufficient amount, and of the larger seeds, as oats, wheat and vetch, about a cupful is necessary.

Samples should be sent by mail, securely wrapped to prevent leakage, and the following information should accompany all samples: Name and address of wholesale and retail dealer, retail price, and name and address of sender. There is no charge for making tests. Address all sample to the Seed Laboratory, North Carolina Department of Agriculture, Raleigh, N. C.

Tobacco seed will also be cleaned for the farmers of the State, and it is highly desirable for all tobacco growers to have their seed cleaned, as the plants from cleaned seed are more vigorous and uniform in size, come on earlier and more nearly at the same time, and the yield and profit of the crop is materially increased. One North Carolina farmer writes us that the crops from cleaned seed in his neighborhood were 50 per cent greater than the crops from uncleaned seed. A vertical airblast seed separating machine, equipped with an adjustable gauge, so that any desired strength current may be obtained, is used for cleaning the seed. No charge is made for doing this work.

Poor and Adulterated Seed.

In agriculture there are often unavoidable losses, but the losses and disastrous results, occasioned by planting poor seed is within the control of the purchaser, and the serious effect of such an oversight cannot be too strongly emphasized. The difference in the price of cheap low-grade seed and high-priced good-grade seed should be no consideration whatever, as even the sum paid for the poor seed is often an entire loss, but this is slight in comparison with the loss of time and labor, the failure to obtain a crop, and the introduction of noxious weeds upon the land, often to such an extent that the production of certain crops is interfered with or made impossible; for instance, wild mustard on wheat land. All of these losses are caused by planting poor seed.

Seeds are poor for a number of reasons: low vitality, due to age; immaturity or improper conditions of harvesting and storing; impurity, due to the presence of other commercial seeds than those of the sale name, weed seeds, quartz particles sifted to the proper size, and other inert matter; any of these may be present by deliberate adulteration or otherwise. The opportunities for adulteration vary greatly with the different kinds of seeds, as the size, form, and color of some are not conspicuously different from those of much cheaper and less desirable seeds which are often

used as adulterants. Some seeds which can successfully be adulterated are the grasses, alfalfa, and red clover, while other seeds as white and alsike clover have form and color more strikingly peculiar to each, and other kinds of seeds cannot be so successfully employed as adulterants.

It is not so serious when commercial seeds are used as adulterants as

when noxious seeds are used. The chief objection to the use of commercial seeds as adulterants, is that the purchaser does not get the crop he desires, and that he pays a higher price than the value of the seed. Illustrations of the adulteration of agricultural seeds, with other commercial seeds, are English rye grass and meadow fescue used to adulterate

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