

## TESTING SEED CORN BY SPECIFIC GRAVITY.

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The corn of our native Indians as found by the first settlers in this country was small in size and of an inferior quality. The white man realized the possibilities of this new corn and at once began to select and improve it. This has been a slow process, and more improvement has probably been made in the last generation than in all the years preceding. The average yield in the United States for the decade ending in 1875, according to J. W. T. Duvel, assistant in the seed laboratory, Bureau of Plant Industry, Washington, was 26.07 bushels per acre, and the yield for the decade ending in 1905 was 25.2 bushels; the largest yield in any one year was in 1906, 30.3 bushels per acre.

During the year 1907 practically one hundred million acres were planted in the United States, requiring sixteen and a half million bushels of seed. Observation has shown that 20% of this seed does not germinate, the chief reason for this being carelessness in selecting and caring for the seed corn.

The yield will depend on the vitality of the seed and on contingency of the weather and soil and cultivation. In years past corn has been planted with little thought of the type of grain and germinating power; often only a random test was made by the aid of a pocket knife. Experienced farmers say that this is a fairly good test but experiment stations rely on and advocate the germinating test. Both of these tests require much time.

Since the yield is largely dependent on the quality of the seed corn, a comparatively simple and efficient seed test is very desirable.

One day I accidentally dropped some kernels in a basin of water. I noticed that the majority of the kernels lay flat on the bottom, while some stood on end, and on examining the latter they were found to be shriveled on the germ end, or had blisters. This gave me an idea of using a specific gravity test, for it must be evident that by increasing the density of the solution the light kernels would rise to the top. The question arose: What should be added to the water that is both harmless and cheap? I

decided on glucose, one part of glucose to three of water, Sp. Gr. 1.21. In this mixture the light kernels came to the top. I thus had light and heavy kernels, and with these I experimented as follows:

*First Test.*—300 kernels were taken from every other row of an ear that tested "good" in the usual "seed box" germinating test: Lot 1, 300 kernels from the alternating rows were divided into two lots by the specific gravity test; lot 2 showed 258 heavy grains; lot 3, 42 light grains. (Lot 1 was not put in solution.) The vitality of these three lots was determined by testing in a box, under identical conditions.

## GERMINATING RESULTS.

Lot 1 (300 grains).....	86% germinated
Lot 2 (heavy kernels).....	89% germinated
Lot 3 (light kernels).....	69% germinated

*Second Test.*—100 kernels were taken from an ear which showed a germinating test of 4 dead kernels and 1 weak out of 5 (the usual test number being 5). These kernels were separated by the specific gravity test and tested as before.

## GERMINATING RESULTS.

Of the 68 heavy kernels.....	47% germinated
Of the 32 light kernels.....	15½% germinated

*Third Test.*—100 kernels were taken from two ears which showed "extra strong" in the germinating test. They were separated by the specific gravity test, which gave a high percentage of heavy kernels, and were tested under conditions similar to the above. (It will be noticed that the per cent of light kernels is quite small and that all germinated.)

## GERMINATING RESULTS.

Heavy kernels (91).....	100% germinated
Light kernels (9).....	100% germinated

*Fourth Test.*—Two full rows were taken from 25 ears, in which all of the five test kernels had failed to germinate in the "box test." This gave a total of 2,116 kernels. The specific gravity test showed 592 heavy and 1,524 light; these were tested as mentioned above.

## GERMINATING RESULTS.

Of the 592 heavy kernels.....	54% germinated
Of the 1,524 light kernels.....	22% germinated

*Field Test.*—Out of 125 bushels of selected seed corn, I reselected enough to plant a thirty-acre field—from which in turn seed for the following year was to be selected, and the germinating test for each ear had to be high. Out of this reselected seed a sufficient amount was put through the specific gravity test until there were enough light kernels to plant a row of 80 rods. The test corresponded with test No. 3, that is, 90 per cent. of the kernels were heavy; all germinated. These light seed were planted in a row alongside of one of heavy; the rows were “checked” and ran east and west, the light row being on the south. Now as our prevailing winds are from the southwest, one can readily see how there might thus be a slight difference: the row of heavy kernels might be fertilized by pollen from the light kernels rather than the reverse.

There was no perceptible difference in the appearance of these two rows, but when a count of stalks was made in August, the heavy row showed an excess of 129. When ripe, the ears from each row were husked and weighed, and there was found to be a difference of 20 pounds in favor of the heavy row—equivalent to nearly three bushels to the acre.

My conclusions from these experiments are as follows:

1. To test seed corn by the germinating test is time-consuming and expensive, and requires great care.
2. Choosing five kernels to represent 600 to 1,000 others from an ear does not prove to be an infallible method. (Test 4.)
3. To test by specific gravity is simple, rapid, and inexpensive.
4. The specific gravity test enables one to eliminate the weak kernels in a simple and practical manner.
5. The crucial test, the field experiment, shows that the light grains should be discarded.

