

Mississippi State University

## Scholars Junction

---

Proceedings of the Short Course for Seedsmen

MAFES (Mississippi Agricultural and Forestry  
Experiment Station)

---

4-1-1960

### Seed Quality

W. P. Caldwell

Follow this and additional works at: <https://scholarsjunction.msstate.edu/seedsmen-short-course>

---

#### Recommended Citation

Caldwell, W. P., "Seed Quality" (1960). *Proceedings of the Short Course for Seedsmen*. 39.  
<https://scholarsjunction.msstate.edu/seedsmen-short-course/39>

This Article is brought to you for free and open access by the MAFES (Mississippi Agricultural and Forestry Experiment Station) at Scholars Junction. It has been accepted for inclusion in Proceedings of the Short Course for Seedsmen by an authorized administrator of Scholars Junction. For more information, please contact [scholcomm@msstate.libanswers.com](mailto:scholcomm@msstate.libanswers.com).

## SEED QUALITY

William P. Caldwell<sup>1/</sup>

The American public today is becoming more and more quality conscious in their buying habits. The farmer is no exception. He demands and gets quality when he purchases tractors, grain drills, television sets, automobiles and breakfast cereals. He also wants his planting seeds to be of good quality.

Today's farmer cannot afford to plant poor quality seed. With the increasing cost of land preparation, harvesting, weed, insect and disease control, it is imperative that the seed which he plants be of high quality in order for him to realize a maximum profit on his investment. Actually, the cost of the seed is a minor part of the total cost of producing a crop. However, the quality of the seed planted plays a major part in determining the profits made from his farming operation. For these reasons, the farmer wants and must have high quality seeds to plant in his fields.

When we speak of high quality seed just what are we talking about? How do we determine the quality of a lot of seed?

One of the first considerations of quality is germination. A seed must be capable of germination or it is valueless for use in seeding. The ability of a seed to grow or germinate can be measured by means of the standard germination test. A set of conditions have been developed, which are as nearly optimum for germination as possible, for practically all the kinds of seed moving in commerce. These conditions are the ones under which seeds are germinated in the standard germination tests. This test, then, will give the maximum germination potential of which a seed lot is capable. This is the germination percentage which appears on the seed tag.

---

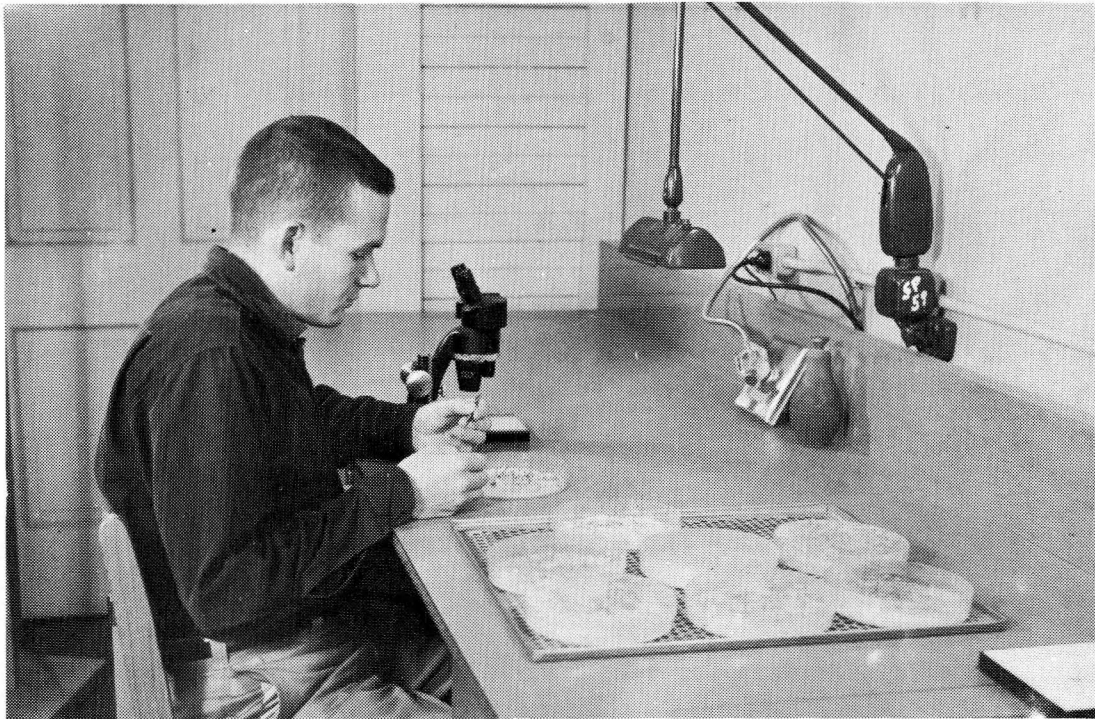
<sup>1/</sup>Mr. Caldwell is Assistant Agronomist, Seed Technology Laboratory, Mississippi Agricultural Experiment Station, State College, Mississippi.

The standard germination test will tell the maximum germination potential of a seed lot when planted under optimum conditions. However, seeds when planted in the field, very seldom find perfect germinative conditions. The temperature may be too high or too low, moisture may be excessive or deficient and disease organisms may be present in the soil which will attack the seed or young seedling. Although two seed lots may perform equally well in the standard germination test, when planted under less than perfect conditions in the field one may emerge much better than the other. This difference in ability to germinate under stress or less than optimum conditions is termed vigor.

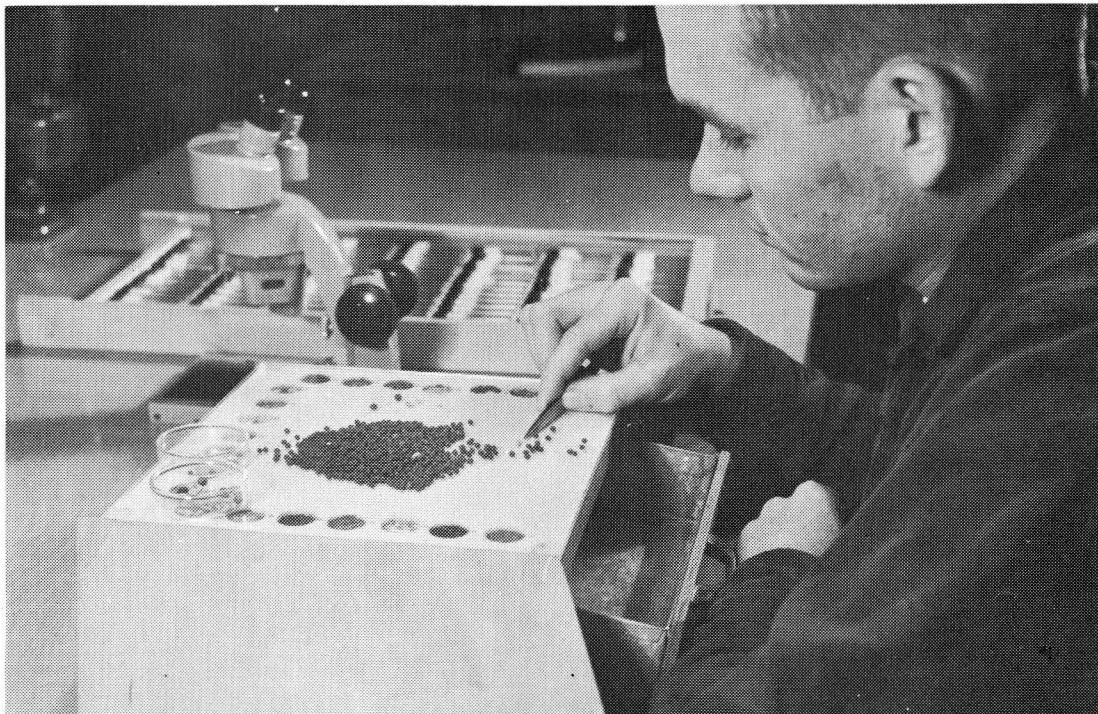
We might think of germination under standard germination conditions, or viability as it is called, as telling whether seeds are alive or dead, while vigor is a rating of the degree of "aliveness" of seeds.

Considerable research is presently being done toward the development of laboratory tests to measure vigor of seeds. Thus far, however, only one such test has been used extensively. The cold test for corn is conducted in wet, cold soil which simulates field conditions that are sometimes encountered when corn is planted early in the spring. The corn cold test is able to measure differences in vigor among seed lots. It has proven useful to seedsmen in detecting lots of corn which are apt to fail when planted under unfavorable field conditions, and in evaluating fungicide effectiveness. By use of this test, the seedsman is able to measure vigor in his quality control program and thus give greater assurance to his customer that his seeds will produce a good stand under a varied set of germinative conditions.

Another factor affecting quality is the mechanical purity of the seed lot. By mechanical purity, we mean the percentages of pure seed, inert matter, weed seeds and other crop seeds present in the seed lot. A high quality seed lot would have a high percentage of pure seed and low percentages of inert matter, weed seeds and other crop seeds. This information is determined by the seed analyst's



Standard germination tests in the laboratory determine the ability of the seed to germinate and to produce normal seedlings.



The purity analysis is an important test in ascertaining seed quality. This analysis shows the amount of pure seed, inert material, other crop seed, and weeds present in a seed lot.



purity examination and is required to appear on the seed tag.

A high quality seed lot will be free of noxious weed seeds. The purchaser of seeds does not want to infest his fields with hard to control noxious weeds when he plants his crop. The number of noxious weed seeds which may be present in a seed lot offered for sale are regulated by the various State and Federal seed laws. The kind and number of noxious weed seeds present in a seed lot are required to be indicated on the seed tag. The noxious weed seed examination which is performed by seed analysts will give a measure of this information.

There are many plant diseases which may be carried on or in the seed. High quality seed, of course, would be free from seed borne diseases. Seeds may be examined for the presence or absence of diseases by means of certain pathological techniques. These are rather involved, however, and generally are not done. The seedsman depends upon field inspection of the growing seed crop and proper seed treatment to insure freedom from seed borne diseases.

Care should be taken to insure that seeds are not damaged mechanically during the harvesting and processing procedures. Seeds which have broken seedcoats tend to deteriorate more rapidly in vigor and viability and are more susceptible to disease organisms than are seeds with intact seedcoats. Certain dyeing procedures, including the Fast Green technique, have been developed to help ascertain whether mechanical damage to the seedcoat has occurred.

Seeds should be free of insect infestation and damage. Fumigation, treatment of the seeds with insecticides, or storage of seeds at moisture levels below 8 % and/or temperature below 50° F. will prevent or minimize insect damage to seeds.

Another factor of major importance to seed quality is trueness-to-variety. A seed lot may be high in germination, vigor, and purity, free from noxious weeds, insects and disease organisms and still be of little value to the farmer if it is not the variety which he desires to plant. For instance, if he is planting wheat in an

area where a certain race of stem rust is prevalent, a wheat variety which is susceptible to this race of the disease may not give him the yield which he wants. If he thinks he is buying seed of a resistant variety, but actually buys a variety which is susceptible, and has been mislabeled as to variety, his crop could be a total loss.

Field inspection of the growing seed crop is a sure way of insuring varietal purity. With some seed kinds, varieties may be identified by seed characteristics, however, techniques have not been worked out for all kinds of seeds. This becomes a difficult problem in crops such as wheat, oats, sorghum and corn where the seeds of many varieties are very similar in appearance. The seed analyst is often able to tell that a lot of seed is not the variety labeled but it becomes difficult to say which variety it actually is.

Seed certification programs have done much to insure varietal purity of seed lots. Fields are inspected by competent inspectors during the growing season and can be certified to be a particular variety.

Another factor to be considered in seed quality is the appearance of the seed. It is true that appearance may not affect the performance of the seed when planted, nevertheless, the buyer is going to be influenced by how the seed looks when he makes his purchase. Discolored seed will not be purchased as readily as bright, well colored seed. The seed itself may have a good appearance but often it assumes a dingy appearance after treatment with fungicides, insecticides, or inoculants. I am not advocating the discontinuing of treatment with these materials, quite the contrary. Seed treatment usually improves the field performance of seeds. Often the seedsman is able to choose dyes or colors which may be incorporated into seed treatments. When applied to seeds these seed treatments do not detract from their appearance but in some cases will actually improve the looks of the seed.

We have looked at the several factors which are concerned in measuring

and determining quality of seeds. Now let us consider a few means by which seed quality can be improved.

A seed is at its maximum viability and vigor at that moment when it reaches full physiological maturity in the field. The various steps which it undergoes in harvesting, processing and storage cannot improve it - it can only go down in viability and vigor. How much the viability and vigor is decreased depends upon how the seed is handled.

One of the first things which we should consider in improving seed quality is the environmental conditions under which the seed crop is grown. As I mentioned previously, the seed is at its maximum vigor and viability when physiologically mature in the field. By improving the growing conditions we can improve upon this maximum level. The closer we can come to perfect growing conditions, the better the seed will be.

Growing conditions can be improved by the use of proper fertility practices, insect and disease control, and irrigation. In some cases, it may be necessary to change growing areas. This has been true in the bean and pea seed industry. Formerly, beans and peas were produced in the Eastern and Mid-Western areas of the United States. It was found, however, that in the Western areas of the country, higher quality seed could be produced due to less humid and more disease and insect free conditions.

Much can be done to preserve seed quality in the way the seeds are harvested, processed and handled. If care is taken to harvest seeds with proper equipment at the proper time to minimize seed damage, and the seeds are carefully processed, a minimum of deterioration of viability and vigor will occur. Much can be done to improve mechanical purity by proper seed cleaning and processing. Processing will be covered at much greater lengths later during the program so we will not go into detail upon this subject now.

High quality seeds can be ruined by improper storage. You have all had

experience with, or heard of serious damage occurring to seeds during storage. Care must be taken to insure that the conditions under which the seeds are placed are such that no serious deterioration in quality will take place. A good rule of thumb to use is that temperature in degrees Fahrenheit plus percent relative humidity in the storage environment should equal 100 or less for good storage conditions. When packaging seed in moisture proof or moisture resistant packages one should be very careful to insure that the seed moisture content is at a level low enough to be safe for sealed storage. Serious damage can occur to the seed if the moisture content is too high.

What benefits can the seedsman expect to derive from producing and selling high quality seeds? As everyone knows the seedsman's reputation is his most valued asset. His business is founded upon his good name. It is true that some profits can be made from "one-time" customers, however, the reputable seedsman wants more than one sale per customer. Repeat business is needed in order for the seedsman to operate on a sound basis. If the seedsman deals in high quality merchandise, at a fair price, he is more likely to build up a reputation as being a reputable and respected operator than he would if he were interested in just meeting the minimum standards for quality in his products. His reputation is based upon the quality of seeds which he sells.

High quality seed can be expected to demand a price premium. The consumer will get more for his money - even at a higher price per unit - with high quality seeds than with those of lower quality. Also, the fact that high quality material is handled, can be used to good advantage in advertising and promotional campaigns.

Dealing in high quality seeds will tend to help alleviate customer complaints and adjustments to the seedsman due to seed failures when planted. High quality seed will perform better under field conditions than will those of lower quality. This will further enhance the seedsman's reputation.



We have covered the factors comprising seed quality and ways of measuring seed quality, means for improving seed quality, and the values to be derived from high quality seeds. I think that you will agree with me that the seedsman can afford to produce and sell nothing but the highest quality seed possible.