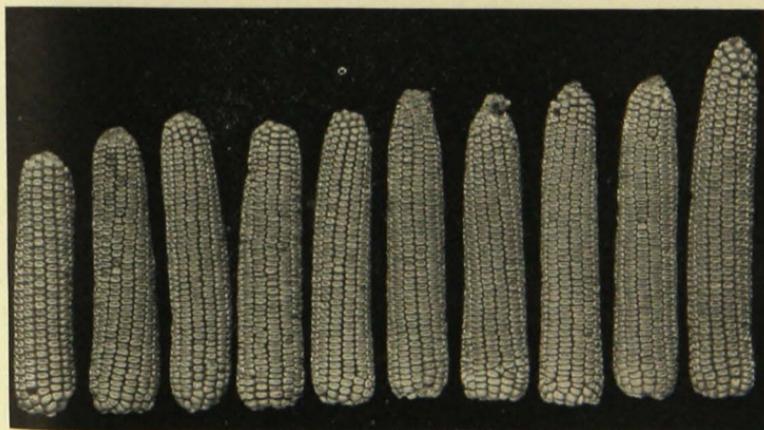


SEED CORN SELECTION AND GERMINATION TESTS

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SEED SELECTION

Whenever possible seed corn should be selected in the field before frost. This makes it possible to study the character of the plant in each case. Too much emphasis can not be placed on this point. Seed should be selected from vigorous, upstanding plants that bear sound, medium-sized ears. The aim should be to select, not the exceptionally large ear, but one of medium size that gives evidence of being capable of maturing in a normal growing season. The large, rough, starchy-kerneled ear is to be avoided in every case. Continued selection of large, late-maturing ears tends to result in plants that are more likely to be caught by frost. On the other hand, selection toward an extremely early type may result in a strain producing small shallow-grained ears tending to light yields. The farmer must choose a happy medium, keeping in mind his location in the state, the type and productivity of his soil, and characteristics of the variety grown.

Selection of uniform show-type ears is not advantageous, as carefully conducted experiments have shown that continued selection toward a fixed type does not result in increased yields. (See page 1.)

A normally maturing plant will show green color even after the ear is fairly mature. This is clear-cut evidence of maximum health and vigor. Ears with such parentage should be the basis for the next year's seed corn plot. After a frost it is impossible to distinguish between the healthy plant and the one that has died prematurely because of inherited weaknesses or disease.

Ears should be selected from erect plants growing in full-stand hills and should be borne at an angle of about 45 degrees on short shanks. It is well to examine the plant and note any weaknesses, such as a weak stalk, drooping ears, and symptoms of smut or any other disease.

In times of threatened seed shortage, seed may be selected from immature corn. Ears with the kernels in the milk stage may be used for seed if they are selected before a killing freeze and are carefully dried before cold weather. While such seed is to be used only as a last resort, it is sometimes necessary. In every case, it is well to select twice the required amount of seed, as this will make possible free discarding of poor ears when the germination test is made.

DRYING FACILITIES MUST BE ADEQUATE

The actual selection of the seed corn is only one step in insuring an adequate seed supply. Every year the ears selected will contain large amounts of water. This must be removed through drying before severe cold weather begins.

Corn that is picked and hung on the fence, in trees, or in open sheds is subjected to a wide range of weather conditions. An ear hanging on the wire fence may dry rapidly during bright sunny days. It may even dry to the point where it is safe from freezing injury. When the weather changes, with the coming of cloudy, damp, rainy days, however, the dry corn takes up water like a sponge and all the work of drying is for naught. A sudden drop in temperature then results in loss of life of the seed and wipes out the results of all previous careful work in seed selection.

The garage, barn rafters, granary, and other dry, well ventilated locations may serve in years when corn is well matured. However, when corn is late and it is necessary to include ears containing an unusually high percentage of water, special means should be provided for driving off the moisture rapidly.

There are many inexpensive methods for putting seed corn in drying quarters. Binder twine, electrically welded woven wire, slatted racks and other home-made apparatus are suitable as well as economical.

Simple Apparatus

A simple apparatus may be used by the average farmer. An attic room over the kitchen will receive considerable heat and hasten drying if there is an outlet for the escape of the moisture laden air. A basement with a furnace is a good place for drying corn. Many basements are so damp that care must be taken to provide adequate ventilation, as corn molds rapidly under such conditions. Some find it advantageous to set up a small stove to hasten drying. After corn reaches the so-called bone-dry condition it may be stored safely in any dry place without artificial heat.

Use Present Equipment

Some farmers have made excellent use of brooder houses for rapid drying of corn. The brooder stove is used in the same way as when young chickens are in the house.

The use of this equipment during a time when it is commonly idle adds greatly to the returns from investments that pay dividends during only a small part of the year.

When bright, clean, lustrous corn is desired, care should be taken to prevent the temperature of the room from going above 100 degrees F. It is highly important to provide an outlet for the moisture laden air, or drying will be slow and actual damage to the life of the seed may result. Complete and adequate circulation of air should always be maintained in drying seed corn. Dead air is good for insulating purposes but undesirable in the seed corn drying room.

CORN CULLING

Even tho considerable care has been exercised in selecting seed ears, it is well to give every ear a careful examination.

Weight of Ear

By grasping each ear in turn with the hand about $1/3$ of the distance from the butt and giving it a short, sharp, quick jerk downwards, one may gain an idea as to the weight by the amount of tension or pull on the wrist. A beginner may select an obviously light ear and one that is heavy. After repeatedly comparing the weight of the two he will become skilled in making this test. With a little practice, the rapidity and accuracy with which one may separate the light, undeveloped ears is surprising. Light ears with poorly developed seeds should be discarded, as their grain will probably not produce healthy, thrifty plants. The use of well developed seed is a great aid when early summer conditions are unfavorable to rapid germination and growth.

Having discarded the light ears, the next work is to examine the remaining seed. Any ear that is inclined to be chaffy may be rejected. Large, late-maturing ears should be rejected. It is best to hold to the medium type, which may be expected to mature in a normal season.

Big, rough ears with faded grains are not desirable for seed. For dent varieties a moderately smooth to rough indentation is preferable. The degree and character of indentation, however, will depend to some extent upon the variety grown. For example, Murdock has a rougher indentation than Minnesota No. 13. The thing to remember in selection is to avoid extremes.

Ears with discolored cob butts should not be used for seed. Any pink or brown discoloration is especially undesirable. An ear with part of the shank attached to the cob is often undesirable. Retting, a shredded condition of the butt, should be regarded as evidence of poor seed. All in all, an ear with any physical defect that gives a clue as to the undesirability of the ear should be discarded, as this means a saving of time later in making the germination test. As considerable more seed than necessary has been selected and dried, one can well afford to be critical. It is far better to reject a fairly good ear by too close inspection than to risk retaining one with dead kernels.

THE GERMINATION TEST

The final test of seed is its ability to grow and reproduce. While an individual ear test is of value, it is not always necessary. It is especially likely to be of value when there has been evidence of plant weaknesses, as shown by the plants growing in the field. A few of these

weaknesses are: (1) Blighting and death of seedling plants; (2) uneven plant development between the seedling and tasseling stages; (3) premature death of scattered plants before the end of the growing season; (4) very late maturing plants that lag behind the field average; (5) long, weak shanks, which let the ears hang straight down; (6) very rough ears with faded starchy kernels; (7) discoloration or moldiness of kernels; (8) butts of cobs shredded or colored brown or pink.

The individual ear test should make it possible to weed out the weak ears, the seed of which is likely to develop unhealthy seedlings. This should help in preventing many slacker plants.

A farmer who has selected his seed early, dried it under good conditions, and carefully culled out the less desirable ears may find it unnecessary to make a test of each ear. A rather large test of kernels, representative of the entire seed supply, which gives 95 per cent strong germination indicates that an individual ear test is of little or no value—the few kernels failing to germinate would be well distributed because of their small numbers and would have no noticeable effect upon the total stand. It is highly important, however, that the test be a good representation of the entire seed supply.

Preparing for the Test

It is necessary to provide some system for numbering the ears tested so that the undesirable ones may be eliminated after the germination test. Often the ears under test may be put on a barn ledge or a shelf. The system of arranging the ears must be simple and fool-proof, or costly mistakes may occur. By dividing the ears into groups of 10, 20, 50, or 100, it is possible to avoid numbering each ear. Marking the first and last ear in a group to correspond to the tester marks will usually be adequate.

Method of Testing

Probably the best known and most widely used germination medium is the rag doll. It is effective, inexpensive, and suited to average farm conditions. The improved rag doll germinator is one of the simplest testing devices available.

To make this test, cut strips of muslin 12 inches wide by 54 inches long, or longer as best suits conditions. Boil thoroly to sterilize the cloth. New material should be thoroly boiled to remove the sizing. This renders the material more workable and enables it better to retain moisture. Old sheets, curtains, or other waste cloth may serve the purpose. While still dry, number the cloth with a wax pencil to correspond with the ear numbers. By numbering every tenth ear, it is easy to prevent errors in reading the test. A corresponding strip of heavy glazed or butcher's paper is next cut to the same width but 6

inches longer. This is to prevent molds that may develop on the kernels of one ear from growing through the cloth and attacking kernels from other ears. The thoroly wet cloth is next placed on the glazed paper as shown in Figure 1. Six to eight kernels are taken from each ear to be tested and placed in straight rows 1 to 2 inches apart. Kernels should be removed from different parts of the ear so as to get a test of grain from each section. The kernels from 20 to 30 ears can be placed on a cloth 54 inches long. If longer strips are used, a central core, as a small roll of screen wire or wire of small mesh, should be placed in the center of the doll to provide air for germination. The grain should not be placed nearer than 4 inches to the end of the cloth having the paper extension. After all space is filled the cloth should be rolled into a doll.

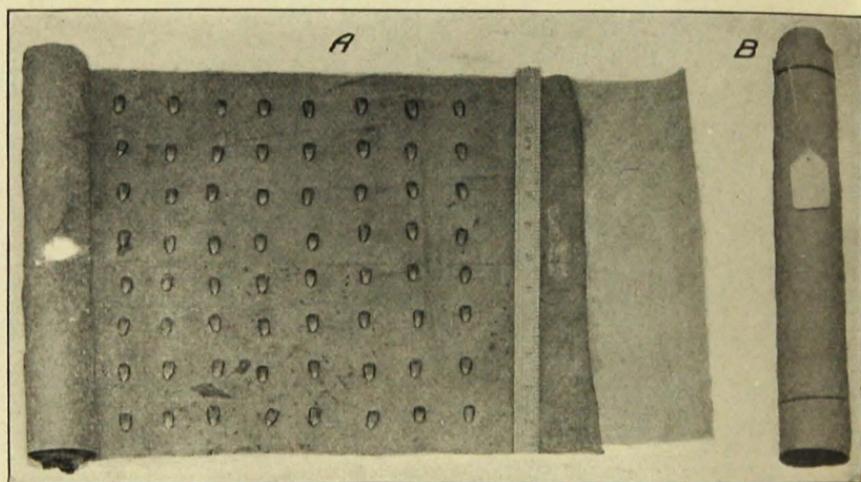


Fig. 1. Improved Rag Roll Germinator

A, Open, showing insulating paper, cloth, and corn kernels in position; B, rolled and labeled

Starting with the end opposite the paper extension, grasp the cloth firmly in both hands and roll the cloth and paper compactly, securing with twine or rubber bands. The doll should be marked with a label giving the date and the numbers of the ears from which the kernels were taken.

The dolls may next be immersed in a pan of lukewarm water for 2 to 3 hours, then drained, and set upright in a pail, boiler, or box. The container should be lined with burlap or gunny sacks, which are kept moist throughout the test. If the dolls dry they may be placed in a pail of warm water for a few minutes. Dolls should be kept in a warm room for 7 to 10 days before reading the test. Often several dolls may be placed in a pail suspended from the ceiling over a furnace or stove. The pail should have holes in the bottom to provide

air drainage, and be lined with moist burlap. Also, a burlap cover should be used. As the dolls will dry rapidly, they should be sprinkled daily with lukewarm water.

Standards Should Be High

In reading the test, one should be critical and no weakly germinating ears should be retained. Any kernel with a weak sprout should be considered as dead and every ear used for seed should show 100 per cent strong germination. Ordinarily, weak or slow germination should bring about the discarding of ears just as quickly as a complete failure to grow. A rag doll partly unrolled for reading is shown in Figure 2.

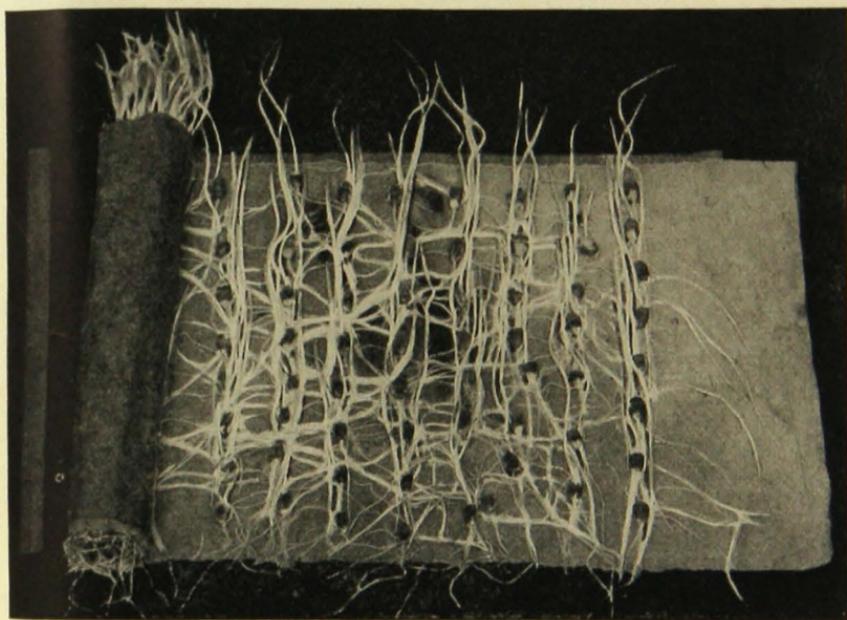


Fig. 2. Rag Doll Germinator Unrolled for Reading Results

The Paper Towel

Recent tests have shown the value of the paper towel test. This is essentially the same as the rag doll test except for the materials used. Waxed paper is used in place of heavy glazed paper and paper hand towels for cloth. The procedure is as follows: Lay a piece of waxed paper on a flat surface. Over this place two soaked paper towels, previously numbered, of the same size as the glazed paper. The kernels are next distributed as with the modified rag doll. After all kernels are in place, another soaked paper towel and one dry one are placed over the corn and the entire lot is rolled tight with the glazed paper on the outside. After labeling and tying, the dolls are placed on end

in a burlap-lined container in a warm room. Provision should be made for air drainage by an inverted bucket or by boring holes in the bottom of the container. It is not necessary to soak the dolls or to add water as the waxed paper retains the water for use of the germinating seed. After 7 to 10 days the test may be read.

Newspaper Dolls

One of the simplest and most effective germination methods can be had by using old newspapers to hold the moisture.

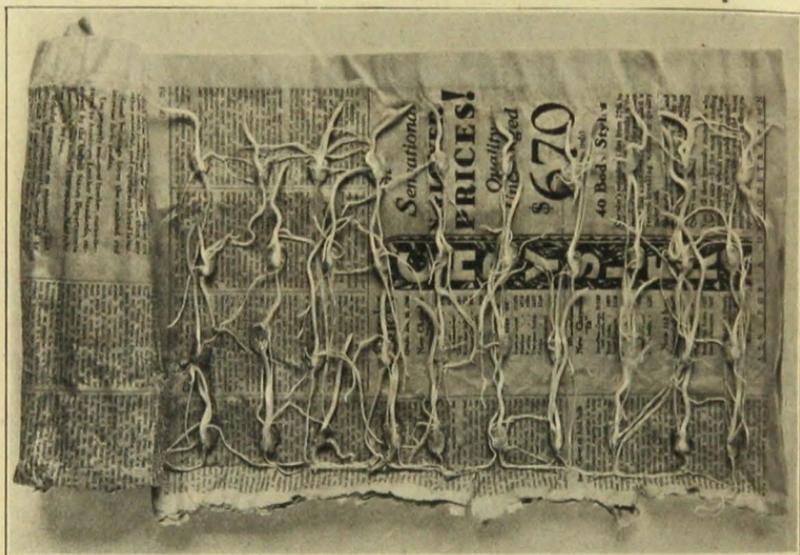


Fig. 3. Newspaper Doll Germinator at Time of Reading Test

Six sheets of newspaper, approximately 10x14 inches in size, should be thoroly soaked in water, and the kernels distributed on the wet sheets. Next, three sheets of soaked paper are placed over the corn. A margin of about one inch should be left on each edge. The lengthwise edges are folded in and the paper is rolled into a doll. After labeling and fastening, the roll is placed in an open two-quart glass fruit jar. The jar is inverted and set in any warm place for germination. A small nail or match should be placed under one edge so as to provide air circulation. The jar may be left in the kitchen cupboard as it requires little space and the kitchen is usually warm. After 7 to 10 days the test may be read in the usual way. This method is especially valuable for a preliminary test to determine the necessity of an individual ear test. A germination of 95 per cent renders an individual ear test unnecessary if the test has been truly representative of the seed supply.