Selecting and preparing seed corn.

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Selecting and Preparing Seed Corn.

Kernels showing large and small germs, taken from different ears of corn. The left hand kernels in all pairs come from ears with low feeding value and should be discarded for seed purposes, while the right hand kernels with large germs come from ears with a high per cent of oil and protein.

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Selecting and Preparing Seed Corn.

Department of Agronomy.

The following circular has been prepared in answer to the many letters which are being received daily asking for information regarding the purchasing and testing of seed corn and its preparation for planting.

When we consider that more than nine million acres, considerably over one-fourth of the entire area of the state, will be planted to corn the coming season and that it will require more than 1,300,000 bushels of seed to plant this area; and when we realize that the character of the seed, its vitality, breeding, purity, adaptability to the soil and climate and uniformity in both size and shape of kernels, all exercise a great influence on the future yield, the great importance of paying the closest attention to the testing and the preparation of the seed corn for the planter cannot be overestimated.

Whatever improvement we can make, in the way of increasing either the quality or yield of the corn crop due to better seed or to better methods of preparing the seed, may be counted as clear profit.

DO NOT IMPORT SEED CORN.

No farmer can afford to depend on imported seed for the main part of his crop. Seed corn imported from a distance and especially from a different latitude seldom gives satisfactory results the first two or three years, even though the seed may be of the best, which oftentimes is not the case.

It is well known that most of the seed corn put on the market by seedsmen is bought of farmers in crib lots, shelled, screened and sacked ready for sale, little or no attention being paid to the selection; in fact, it is generally handled with a scoop shovel, and is known as the "scoop shovel method of selection."

The chances are that the farmer has in his own crib better corn than that which he purchases from seedsmen at four or five times the market price. And then he runs the additional risk that it will not mature in his locality.

If it were simply a matter of losing the price of the bushel of imported seed corn, it would not be serious, but when we consider that a bushel of seed corn ought to produce 400 bushels of corn worth from $130 to $160, the serious nature of the question is very apparent.
If, for any reason, my own corn was not satisfactory for seed, I certainly would not send away for seed corn, but would purchase from some one in the vicinity whose corn has given good results during the past three or four years.

The above cut illustrates one of the most convenient methods for testing the vitality of seed corn. Fig. No. 1 shows the box in which are placed folders containing samples of corn to be tested. Fig. No. 2 shows a folder ready to put in the box after the edges have been folded down over the corn. Any box will answer the purpose although the cigar box represented in the cut, or a wooden one like it, is preferable.

The folders should be thoroughly moistened before placing the corn in them. Put four or five thicknesses of moistened paper in the bottom of the box and as many more over the samples to prevent drying out. Then shut the cover and wrap a string around the box to hold the cover down to prevent the corn from drying out, and set away in the sitting room or some place where the temperature does not fall below 55 degrees. The best folders are made by taking five or six thicknesses of newspaper and cutting in strips about five by ten inches and folding as shown in the cut. The only precaution necessary is to be sure that the folders are thoroughly moistened before the corn is placed in them for testing. In two or three days it will be well to examine the corn and if the folders are getting dry, they should be moistened by sprinkling water over them in the box. At the end of five days the samples should be taken out and examined carefully. Every kernel that has not at this time sent out vigorous root and stem sprouts should be counted unfit for seed. The corn ought to test not less than 94 to 95 per cent. This method has the advantage of requiring very little attention and makes it possible to see whether the kernels are making a uniform and vigorous germination, which is very important. Kernels which make a slow, feeble germination are not fit to plant.

It will be an excellent plan, however, for two or more persons in a neighborhood to secure a small amount of good seed
of some of the standard varieties of this and of other states, and give them a good trial. In this way it is probable that varieties will be found which, after they have become acclimated, will prove of considerable value to the community.

The kernels on ear No. 1 are too thin and those on ear No. 4 are too narrow, while those on ears Nos. 2 and 3 are too broad and thick. Ears of this kind should be discarded for seed purposes as no planter can be set to drop the kernels evenly. The planter tests with this corn showed a variation in the dropping all the way from 1 to 6 kernels per hill.

PURCHASE SEED CORN IN THE EAR.

I would recommend the purchasing of seed corn only in the ear. This enables the purchaser to see exactly what he is getting and if it is not satisfactory, he can return it. It also enables him to throw out any undesirable ears. The seedsman
cannot improve the corn by shelling it, so there is no good excuse for him to refuse to ship it to you in the ear.

In order to secure a good stand it is necessary to exercise great care in selecting and sorting the seed. All ears with very large or very small kernels should be thrown out, no matter how perfect they are in other respects. The same is true of all ears with very thick or very thin kernels, or with very short or very long, narrow grains, and the irregular butt and tip ker-

Nos. 5 and 2 illustrate ears of corn with good strong kernels of medium depth. Ears Nos. 1 and 3 illustrate very shallow kernels, and if the kernels from these four ears are mixed it is impossible to plant them evenly. Ear No. 4 shows space at the cob which indicates weak vitality, low percentage of corn to cob and low feeding value, the valuable portion of the kernel not being filled out. When examined externally these ears all appeared equally good, and this shows the importance of removing several kernels when selecting seed corn.
nels should be shelled off. In other words no planter will give an even stand unless the kernels are of uniform size and shape.

PLANTER TEST.

I know of no one thing that would do more to increase the yield on every farm in the corn belt than the careful selecting and sorting of the seed corn, both in the ear and after it is shelled; and then stay with it, until the planter will drop the desired number of kernels per hill at least 93 to 96 times out of 100 tests. It may be necessary to have the plates of the planter drilled or get new ones, or take more care in sorting out the large, small, and irregular kernels. The main thing is to stay with it until the work is satisfactory. This is simply a matter of good business management and no one can afford to neglect it, for there is so much of our success depending on every bushel of the seed corn we plant.

The following planter tests have just been made, and the results emphasize the importance of using only uniform sized kernels to secure a good average stand.

The above cut shows good and bad forms of kernels. The pairs of kernels Nos. 1, 2, 11 and 12 show the best forms in order named, while Nos. 4, 5, 6, 7 and 8 show the poorest forms in the order named. Pair No. 1 is the best since the kernels are full and plump at the tips next to the cob and have large germs. Both of these points are important as they indicate strong vitality and feeding value. On the other hand, pairs Nos. 5, 6 and 7 are especially weak with low feeding value and small per cent of corn to cob.

It will also be observed that these kernels are far from uniform in size and shape (compare Nos. 4, 2 and 6) and hence no planter will drop an even number per hill. (See table of tests.) When we realize that all of these kernels were taken from ears that appeared to be good ears, when examined from the standpoint of the ear alone, we can readily appreciate the importance of paying more attention to the study of the kernels of corn in our seed ears.
When all the kernels of the ear were used the following record was made in 100 drops:

1 kernel ............................................ 1 time.
2 kernels ........................................... 6 times.
3 kernels ............................................ 66 times.
4 kernels ........................................... 25 times.
5 kernels ........................................... 1 time.
6 kernels ........................................... 1 time.

When only the middle kernels of the ear were used, the following record was made in 100 drops:

2 kernels ........................................... 8 times.
3 kernels ........................................... 92 times.

When the tip and butt kernels of the ear were used the record in 100 drops was:

No kernels ........................................... 3 times.
1 kernel ........................................... 14 times.
2 kernels ........................................... 30 times.
3 kernels ........................................... 48 times.
4 kernels ........................................... 5 times.

When deep and shallow kernels of good quality, differing only in depth or length of kernel, were used the resulting record was:

2 kernels ........................................... 5 times.
3 kernels ........................................... 75 times.
4 kernels ........................................... 18 times.
5 kernels ........................................... 2 times.

The following is the record made by separating the kernels so as to have uniform sized kernels in each lot:

Group 1—Shallow Kernels. Group 2—Deep Kernels.

(Proper plates for each.)

1 kernel ........................................... 2 times.
2 kernels ........................................... 4 times.
3 kernels ........................................... 95 times.
4 kernels ........................................... 92 times.
5 kernels ........................................... 4 times.

Care need be exercised in selecting ears with kernels that show regularity while on the ear, as the following test shows:

Ears with very irregular kernels—butt and tip kernels shelled off. (See ears 2 and 3, cut I.):

1 kernel ........................................... 6 times.
2 kernels ........................................... 19 times.
3 kernels ........................................... 74 times.
4 kernels ........................................... 1 time.
By comparing this with regular kernels from another ear, butts and tips shelled off, the value of the test is clearly shown. Regular kernels:

2 kernels .................. 8 times.
3 kernels .................. 92 times.

These two rows of kernels were taken from two different ears. Judging from outward appearances of the ears, little or no difference in their values could be discovered. The ears from which these two rows of kernels were taken were almost exactly of the same size, yet ear No. 2 weighed 16 per cent more than ear No. 1, and shelled out 20% per cent more corn than ear No. 1. Ear No. 1 is not only very much poorer in feeding value than No. 2, but has a much lower vitality and gives a weaker plant.

It is very important that the tips of the kernels—the portion next to the cob—should be full and plump so that there is no space between the kernels down near the cob. In selecting our seed corn it is important that we should do more than look at the ears; we must study the kernels.

These tests show that the only way to get an even stand of a uniform number of kernels is by energetic, earnest testing of the corn planter before it is taken to the field. Test the plates until you can get one that drops 93 to 96 times out of a hundred the number of kernels that you want. If no plate is satisfactory, drill one down or secure new plates that will give satisfactory results.

TEST VITALITY OF SEED.

It is a good plan to make a preliminary test of the vitality of the seed before the sorting is done, to determine whether it is fit for seed purposes or not. This can best be done by selecting from the pile, say fifty or one hundred ears, and removing two to three kernels from each ear and testing them. If the germination test shows 94 per cent or above, the seed will certainly be in good condition. It is important that each ear of corn be shelled by itself so that it can be examined more closely before it goes in with the rest of the corn. If the kernels are shrunken at the tips, too pointed, discolored, or the germ is small, indicating low feeding value, the whole ear should be
discarded. If, on the other hand, the ears of corn are all shelled together, it will be impossible to select out all the weak kernels.

After the corn has been sorted, shelled and thoroughly tested in the planter, it should be put back in sacks, about a bushel in each sack and hung up in a dry place in the loft or where there is thorough circulation of air, and where it will be free from mice, but do not hang it over a stable.

Showing different types of corn. In selecting seed corn, it is important that all the ears be as nearly as possible of the same type. Ears Nos. 3 and 4 are very good ones, but they should not be planted with Nos. 1 and 2 as they are fifteen days later in maturing than the latter. In order to secure the best pollenization it is important that all the stalks should shoot and the ears silk at about the same time. The very early and very late stalks are usually barren or partly so, owing to lack of pollen at these times. It is also difficult to secure an even stand with corn of different types, as kernels are almost certain to be of different sizes and shapes, making it impossible for a planter to drop them evenly.
About the twentieth of April, a thorough germination test should be made. There are many methods of doing this and any of them will be satisfactory. The important thing is not to fail to make the test. About one hundred kernels should be taken from each sack by running the hand down into the corn so as to get a fair sample.

One of the simplest methods of testing seed corn, and one which requires little attention, is to fold up twenty-five or fifty kernels of the corn in a piece of wet paper and put it in a box. There is nothing better than a cigar box for this purpose. The paper should be thoroughly wet and several thicknesses used so that it will not dry out. It is well to place some moistened pieces of paper in the bottom of the box and again on top of the samples to hold the moisture.

In order to make a thorough test it will be well to prepare at least five or six samples like the one described above. They should all be put into the same box and a string tied around

No. 2 kernels with chaffy portion of cob adhering indicating lack of maturity.
No. 3 shows broken kernels. Ears with kernels of this kind should be discarded.
No. 5—Kernels with the tip portion protecting the germ broken off. While kernels of this kind frequently grow, yet it indicates lack of maturity.
Pairs of kernels Nos. 1, 7, 8, 9 and 10 show good, deep, well-filled germ, thus indicating strong vitality and good feeding value. Nos. 11, 12 and 13 show short germs, indicating weak vitality and low feeding value.
it so as to hold the cover on tight, to prevent the corn from drying out. At the end of three days it will be well to examine the corn and if the papers are getting dry they can be moistened. At the end of five days the final examination should be made.

SORTING SEED CORN.

I know of no better way to sort and prepare the seed corn than to place forty or fifty ears on some boards or tables and with all the tips pointing one way. Select an ear that most

In selecting seed corn ears Nos. 2 and 3 should be discarded as no planter will drop a uniform number of these kernels per hill.

Ears Nos. 1 and 4 have kernels of uniform size and shape and when the butts and tips were shelled off the planter dropped 3 kernels to a hill 93 to 95 times out of every hundred tests while ear No. 3 tested 74—3's, 19—2's, 6—1's and 1—5.

nearly represents the type you prefer. With this ear in your left hand, go over all the ears on the board and, with the right hand push out those ears which show too great variation from

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the type in size, length, shape, roughness, color, size and shape of kernels, etc. Now gather the few remaining ears together, and, with a knife, remove three or four kernels from each ear and place in front of each ear, with the germ or chit side up.

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The kernels on ear No. 1 are nearly the same depth from tip to butt, while the kernels on ear No. 2 grow rapidly shorter towards the tip. The kernels on ear No. 3 are small, shallow and flinty, little larger than grains of pop-corn and will run through the planter about like wheat. When these three ears were shelled together and tested in the planter there was a range of all the way from 2 to 7 kernels per hill.

Now go over these kernels carefully, for here is where we have failed most in the past. We have studied the ears, but have paid little attention to the kernels. First discard those ears which have kernels unusually broad, long or thick, also those
which are very narrow, thin or short. This is absolutely necessary before we can expect any planter to drop a uniform number of kernels in each hill. Discard all ears with kernels which are shriveled, or are too pointed, indicating low vitality and poor feeding value. The butts and tips should now be shelled off and the ears shelled as above described. But this is not all. This corn is not ready for the planter until it has been picked over by hand, removing the broken, rotten, discolored, irregular, weak and chaffy grains. This seems like a great deal of expense, but no farmer can afford to do less than this.

When we remember that it is possible for a bushel of seed corn to return us 700 bushels next harvest, we can readily see the folly of neglecting this work. What is a day, or even two days, spent on this bushel of seed corn, and especially at this season of the year?

Cross-sections of kernels showing depth of germ and the white, floury or starch portion lying just below the germ. The kernels in the lower row have better germs than those in the middle row. Nos. 17, 15, 13 and 15 are among the best, while Nos. 2, 14 and 18 are among the poorest because they have very shallow germs and are low in feeding value. The white, starchy appearing material lying just below the germ has the very lowest feeding value of any part of the kernel. Nos. 17, 15 and 11 show a very small amount of this material, while Nos. 1, 2, 12 and 19 show a great deal and should be discarded for seed purposes.

The upper row (Nos. 21 to 37) show the depth of the germ when the kernels are split in two lengthwise through the middle of the germ. Nos. 21, 24, 27, 28, 29, 33 and 35 show very deep germs and are from ears rich in protein and oil. No. 35 being from the ear richest in protein of 2,000 tests, while Nos. 22, 23, 36 and 37 are from ears very poor in feeding value. It will also be noticed that the germs are very small.
SUMMARY.

First: That it is very important that we should depend upon home grown seed for the main part of the crop, and not upon imported seed.

Second: That we should select ears of corn for seed which have kernels of as nearly uniform size and shape as possible, otherwise it will be impossible to secure an even stand with any planter.

Third: Do not fail to test the planter thoroughly with the seed you intend to use, and stay with it until it drops regularly the number of kernels required in each hill.

Fourth: Test the vitality or germinating power of all corn intended for seed. This is especially important this year.

Fifth: In case any seed corn is purchased from seedsmen, insist on having it shipped to you in the ear, either in crates or in barrels.

Sixth: All of this work, that is, the testing of the vitality, the sorting, the shelling and the testing of the planter, should be done now, and the sooner the better. If put off until the hurry of spring work is upon us, there is danger that it will not be done at all.

Corn is our greatest cereal crop. The Statistician of the Department of Agriculture reports the corn crop of the United States for 1902 as being 2,500,000,000 bushels, worth over $1,000,000,000. This is the product of 91,000,000 acres, giving an average yield of 26½ bushels per acre.

**LEADING CORN STATES.**

<table>
<thead>
<tr>
<th>STATE</th>
<th>ACREAGE</th>
<th>TOTAL YIELD</th>
<th>AVERAGE YIELD PER ACRE</th>
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</thead>
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<tr>
<td>Illinois</td>
<td>9,623,680</td>
<td>372,436,416</td>
<td>38.7</td>
</tr>
<tr>
<td>Iowa</td>
<td>9,302,688</td>
<td>297,656,016</td>
<td>32.0</td>
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<tr>
<td>Nebraska</td>
<td>7,817,962</td>
<td>252,520,173</td>
<td>32.3</td>
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<td>Kansts</td>
<td>7,451,693</td>
<td>222,805,621</td>
<td>30.9</td>
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<tr>
<td>Missouri</td>
<td>6,775,195</td>
<td>264,232,605</td>
<td>39.0</td>
</tr>
<tr>
<td>Indiana</td>
<td>4,520,637</td>
<td>171,332,142</td>
<td>37.9</td>
</tr>
<tr>
<td>Ohio</td>
<td>3,200,224</td>
<td>121,608,512</td>
<td>38.0</td>
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These are the states of the Union giving a yield of 100,000,-000 bushels or more and are therefore the great corn states of the corn belt. At the Experiment Stations of each of these states special work is now being done to determine how to increase the yield per acre, so as to supply the growing demand for this most useful cereal.
SCORE CARD FOR CORN AND EXPLANATION OF POINTS.

1. Trueness to Type or Breed Characteristics.......................... 10
   The ten ears of the sample should possess similar or like characterisitics and should be true to the variety which they represent.

2. Shape of Ear............................................................................ 10
   The shape of the ear should conform to variety type, tapering slightly from butt to tip, but approaching the cylindrical.

3. Color—
   a. Grain.......................................................... 5
   b. Cob.......................................................... 5
   Color of grain should be true to variety and free from mixture, with the exceptions of a few varieties. White corn should have white cobs, yellow corn red cobs.

4. Market Condition (vitality, maturity, etc.).............................. 10
   The ears should be sound, firm, well matured and free from mold, rot or insect injuries.

5. Tips ...................................................................................... 5
   The tips of the ears should not be too tapering and should be well filled with regular uniform kernels.

6. Butts ..................................................................................... 5
   The rows of kernels should extend in regular order over the butt, leaving a deep depression when the shank is removed. Open and swelled butts are objectionable.

7. Kernels—
   a. Uniformity of .............................................. 10
   b. Shape of .................................................. 5
   The kernels should be uniform in shape, size and color, and true to the variety type. The kernels should be so shaped that their edges touch from tip to crown. The germ or chit and the tip portion of the kernels are the richest in protein and oil, and hence of the highest feeding value. For this reason the germ should be large and the tip portion should be full and plump.

8. Length of Ear ................................................................. 10
   Northern section, 8½ to 9½ inches; central section, 8¾ to 9¾ inches; southern section 9 to 10 inches.

9. Circumference of Ear.......................................................... 5
   Northern section, 6½ to 7 inches; central section, 6¾ to 7¼ inches; southern section, 7 to 7½ inches.

10. Space—
    a. Furrow between rows ........................................... 5
    b. Space between kernels at cob .............................. 5
    The furrow between the rows of kernels should be small. Space between kernels near the cob is very objectionable.

11. Proportion of corn to cob................................................... 10
    The proportion of corn to cob is determined by weight. Depth of kernel, size of cob and maturity all affect the proportion.

Total....................................................................................... 100

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