Corn Planting.

by

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Corn Planting. (outline)

I. Selection of seed.

(a) Selection with reference to stalk.
(b) " " " " ear and kernel.

II. Care of seed and testing of same.

III. Previous preparation of the ground.

IV. Time of planting.

V. Rate of seeding.

VI. Depth of seeding.

VII. Planters.

In the raising of corn too much importance cannot be laid upon the selection of seed. The question often arises with farmers as to whether to select from their own fields or from those of a neighbor or whether to buy seed which has grown in some other section of the country. As a general proposition it may be said that unless the corn of a community is very poor it would be better to select home grown seed rather than to buy seed which was grown in a different climate or soil.

In buying seed corn care should be taken to procure that which has come from a locality of similar climate, soil, and general conditions, such as length of season, rainfall, etc., to that in which it is to be grown.

Importance of stalk, ear, and kernel in seed selection.

The year book of the Department of Agriculture for 1902 contains an excellent discussion on this subject, from which I have made notes. In testing the advisability of considering the stalk, ear, and kernel in seed selection several experiments were performed.

I. One stalk of "Perfect Golden Beauty" variety was noticed to have very broad leaves. The ear of this stalk was hand-pollinated from the same stalk. The corn from this plant was planted and the resulting plants showed the same characteristics as did the parent plant. This was also the case with the second year's selection.

A few short and very leafy plants were found in a field of tall growing white dent corn. These stalks were from 4-5 feet high, while the normal height of the variety was about 10 feet. A few of these short stalks were selected and cross-pollinated one with another. The resulting seed was planted in a row next to the normal stalks of the variety. The contrast between the normal and selected corn was very noticeable.

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II. In this experiment four flint and two dent ears were selected. Two of the flint ears were high and two low in their percentage of grain to cob. The dent ears were about alike in this respect. The resulting ears resembled the parents, not only in the percentage of corn to cob but in diameter of cob as well.

Table I. - Showing similarity of offspring to parent ears.

Type	selection number of seed ears	percentage of shelled corn of seed ears	percentage of shelled corn of all progeny ears	diameter of cob of seed ears inches	average diameter of cob of progeny ears inches
Flint	85-2	73.1	73.8	1.37	1.27
	85-1	73.2	74.6	1.37	1.24
	85-3	81.1	77.1	1.00	1.10
	85-4	84.6	78.5	1.12	1.11
Dent	86-1	83.4	82.4	1.12	1.15
	86-2	85.1	84.7	1.12	1.16

Experiments conducted at the Iowa Experiment Station have shown that the height of ears on the stalk can be regulated by selection. If the seed is taken from a stalk having the ear high up the resulting ear will be borne high on its stalk. On the other hand if seed selected from stalks bearing their ears low be planted, the resulting stalks will resemble the parent and the ears will be low on the stalks.

The time of seed selection should be governed by the date on which it is desired to have the crop mature. In localities having a short growing season an early maturing variety should be used, while in localities having a longer period of growing weather later maturing corn is well adapted, since it has been demonstrated that late maturing varieties are larger producers than the early maturing sorts.

In the selection of seed for the production of fodder or ensilage the stalk should be large and vigorous and have a large proportion of leaves. If grain production is the end in view the stalk should not have an excess of stalk and leaves but should be fairly large,

healthy and vigorous, strong at the base and gradually tapering toward the top.

Selection with reference to ear and kernel:-

The result to be sought is an increased production of corn of good quality; as the raising of corn of a high percentage of corn to cob tends to increase production it is desirable to select to that end. The main points to be considered in respect to the ear and kernel are, (1) a large production of seed of good quality, and (2) uniformity.

The productiveness or high per cent of corn to cob is indicated by: (1) size of ear.- circumference and length.

(2) size of cob.

A large proportion of corn to cob may be determined with considerable accuracy by inspection, the principal points to be considered being:

(1) Length of kernel to size of ear.

(2) Shape of kernels.

(3) Space between rows.

(4) Space between kernels in row, at crown and tip.

(5) Space between rows at tip.

(6) Straightness of rows.

(7) Well filled butt and tip.

(8) Cylindrical shape of ear.

Aside from the size and shape of kernel as effecting the yield there should be uniformity. No planter can give a good even stand without uniform kernels.

In the selection of seed corn it is important to begin at the proper time. For example if a corn of early maturing qualities is desired commence the selection as the first stalks begin to mature. If a late maturing variety is desired wait until all the corn is ripe

and then select from the stalks which are yet somewhat green. When selecting seed corn from the field, an ideal type of ear must be kept constantly in mind. The best method of breeding to aid systematic selection is to plant the very choicest ears in a plot by themselves or in the edge of the field. It is important to plant the breeding corn on land similar to that on which it will later be grown. In this way the work of selection is lessened, as there is not so large a field to look over and the corn is apt to be fertilized by pollen from better than average plants. It is better to plant each row with the seed from a separate seed ear. In this way the product of each ear can be husked and weighed separately, which will aid materially in selecting seed corn of high yielding capacity.

In the selection of seed corn the mistake should not be made of always picking the largest ears. Often in the largest producing varieties the ears are of medium size rather than large. After experimenting upon this subject the Nebraska Experiment Station reports that their five most productive varieties of corn average 0.705 pounds per ear, which makes about 99 ears per bushel.

Care of seed (storing).

The seed corn should have better care than the corn intended for feed. As moisture and freezing together injure the germinating power or vitality of the seed, the corn should be husked and dried before freezing weather commences. The ears should not be stored in heaps but should rather be spread out not over one ear deep. It is a good plan to leave some of the husks on each ear so that the ears can be tied together in pairs and hung over wires in the upper part of the store room.

Another good way of storing the seed is to make shelves of lath,

making the shelves about three inches one above another, and leaving about an inch space between the laths on the shelf. This will allow for one layer of ears on a shelf and will insure perfect ventilation and drying. Corn stored in this way in a room which can be well ventilated and kept dry, will hold its vitality much better than that stored in the crib in the ordinary way, especially in cool or damp weather.

The store room should be warmed by means of a fire for a part of each day after storing, for about two weeks. Mr. C. P. Hartley, of the United States Department of Agriculture, in experimenting upon the subject of the advisability of artificially drying seed corn, found that there was practically no difference in the rate of germination of air dried and fire dried corn, but 70.9 per cent of the air dried and 73.8 per cent of the fire dried grew. He also found that at harvest time the corn had increased by growth of suckers 19.7 per cent in the "air dried" rows and 29.4 per cent in the "fire dried" rows, the "air dried" and "fire dried" corn being planted in alternate rows. The "fire dried" seed produced more and better corn, row for row, than the "air dried" seed. The total average production per stalk in the "fire dried" rows was 0.672 pounds against 0.618 pounds per stalk in the "air dried" rows, and the former contained 12.5 per cent more stalks at harvest time than the latter. The greatest difference in production was on river bottom land, where the "fire dried" seed produced an average yield of 85.59 bushels of ear corn per acre, as compared with 67.34 bushels from the "air dried" rows, a difference of 18.25 bushels per acre in favor of fire drying the seed corn. On upland clay soil the "fire dried" seed produced 63.92 bushels per acre while "air dried" seed produced 56.88 bushels, a difference of seven bushels in favor of the "fire dried" seed.

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A similar experiment was performed by the Experiment Station of Nebraska. The corn from a certain field was divided into two lots. One part was stored in an ordinary crib, while the other was stored in a dry seed room. The next spring these two kinds were used in a field test. The seed room corn germinated 90 per cent and that from the crib germinated 70 per cent. The report also states that many of the plants from the crib corn were very weak, showing impaired vitality.

Testing seed corn.

The testing of seed corn though practiced but little is an excellent way of increasing the stand. The work necessary is but slight and comes at a time when it can best be done. There is probably no part of corn raising which will pay as well for the labor put forth as that of testing the germination of the seed. All that is needed is a vessel in which to keep the corn moist and warm, with provision for keeping the kernels of each ear separate. There are many different germinators on the market, but the work can be done just as well with a home made one, and at little expense.

The ears should be laid in order and numbered so that they can be identified. The germinator should be arranged with squares marked off and numbered with numbers corresponding to those of the ears.

The germinator can be made of a box 2 feet square and 3 or 4 inches deep. An inch of sand is placed in the bottom and thoroughly moistened. The sand is smoothed off and covered by a cloth the same size as the box. This cloth is marked off into 2-inch squares, each of which is numbered with a number corresponding to one of the ears. Only the kernels of one ear are placed on one square, so that each lot of kernels can be referred to its respective ear.

In sampling the ears some system should be adopted. It is a

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good plan to take as many as six kernels from each ear, one from near the butt, one from the middle, and one from near the tip, on opposite sides of the ear. Now if this is ear No.1 it is put back into its proper place on the shelf, while the kernels are placed on square No. 1 of the germinator, and so on with all of the ears. After the ears are all sampled and the kernels placed in the germinator, the latter is covered over with another cloth, larger than the first, and the whole is covered with a layer of moist sand. The germinator must be kept moist and in a warm place. At the end of six or seven days the sand and top cloth are carefully removed, and results noted. If the moisture and temperature have been right, all the kernels fit to plant should have germinated by the end of the seventh day. If any of the kernels have failed to germinate or if a number have made a weak start the corresponding ear should be discarded.

Previous preparation of the soil.

In corn raising the previous preparation of the soil is an important factor as effecting the fertility, physical condition, and moisture content of the soil. This heading embraces not only the preparation immediately before seeding but also that for several seasons past. Land which has been cropped to corn continuously will not produce as well as it would if a properly arranged rotation was used. I will not attempt to discuss the rotation of crops as effecting the production of corn. However it has been proven that by proper rotation the production of corn may be very materially increased. The essential crops in a good rotation such as should improve soil fertility are: a cultivated crop, a small grain crop, a leguminous crop, and grass. These crops following in proper order will increase both the fertility of the soil and the moisture content of the same. The addition of (barnyard) manure is also essential in this connection. The best time to manure is when the land is in grass.

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In respect to the direct preparation of the soil for planting the Missouri Experiment Station was performed some experiments extending over three years. In these experiments, one plot was thoroughly plowed, that is a 12" plow was made to cut only 7" and was run to a depth of 8". On another plot the same plow was set to cut about 16", thus leaving some of the soil undisturbed. Another plot received no preparation whatever. Another was cultivated to a depth of 2" - 3" with a disc,and the last was prepared by the use of a spring tooth harrow. All plots were planted with a surface planter at the same time and in the same manner. The cultivation given all was clean, level, shallow cultivation. The results of the trials are given in the following table:

Table II.
Showing results of preparation of soil for planting.

Treatment	1889		1890		1891		Average	
	Yield of corn per acre bushels	Yield of stover per acre pounds	Yield of corn per acre bushels	Yield of stover per acre pounds	Yield of corn per acre bushels	Yield of stover per acre pounds	Yield of corn per acre bushels	Yield of stover per acre pounds
Thoroughly plowed	39.4	3020	31.1	1690	41.4	2940	37.3	2550
Partially plowed	41.3	3180	32.9	1690	37.9	2965	37.4	2612
Not plowed	43.3	2680	28.7	1490	30.1	2725	34.0	2288
Ordinary plowing	41.3	3060	33.1	1630	33.1	2745	35.8	2478
Surface cut with disc harrow			24.0	1410	30.6	2550	27.3	1980
Surface cut with spring tooth harrow			27.3	1630	32.6	2755	29.9	2192
*Deep plowing			41.1	1870	44.7	3640	42.9	2755
§Shallow plowing			46.0	2000	49.2	3855	47.6	2927

*Nine inches deep

§ Four and one half inches deep

In this it will be seen ,the first year, the plot not plowed gave more corn than any of the others, but after that it dropped back steadily. The large yield in this plot of the first year was due to the wet season. The shallow plowing, 4-1/2", gave the best average results. In another test, ground which was subsoiled, compared to land not subsoiled, gave a small gain in the production of stover but an actual loss in ear corn.

In 1903 the Kansas Experiment Station began an experiment which was carried through three years. The experiment consists in preparing the ground in different ways. A piece of land was chosen which had been planted in corn the year before, divided into plots which were treated as follows: One plot was double disked early in March, another was double disked and harrowed. A third plot was listed in furrows 3-1/2" feet apart. One plot was plowed and harrowed afterward, and one was left untreated,as a check. The corn was planted in all the plots early in May. The ridges of the plot which had been listed early were split with a lister and the corn planted in the new furrows.

The next year a few more plots were added, which were respectively treated as follows: One was plowed deep, another shallow, and another was listed early and the corn later planted in the same furrows.
The results are shown in the table below:

Table III.
Showing results of different methods of preparing land for listing corn.

Treatment of plot.	Yield per acre. 1903 Grain bu.	1903 Stover tons	1904 Grain bu.	1904 Stover tons	1905 Grain bu.	1905 Stover tons	Avg. for 3 yrs Grain bu.	Avg. for 3 yrs Stover tons
* Double-disked and harrowed	65.18	1.58	50.27	1.26	43.54	1.46	52.99	1.43
* Double-disked	68.61	1.81	55.12	1.50	35.43	1.27	53.05	1.52
* Untreated	64.14	1.79	58.35	1.44	38.17	1.50	53.22	1.58
* Listed ridges split at planting time	74.28	1.55	52.37	1.43	38.34	1.67	55.00	1.55
§ Plowed medium deep and harrowed	61.26	1.15	54.96	1.46	39.60	1.68	51.94	1.43
§Plowed shallow and harrowed	-----	-----	-----	-----	41.71	1.74	---	----
*Listed, planted in old furrows	-----	-----	-----	-----	43.31	1.35	---	----
Method of planting								
Plowed, surface planted	52.30	-----	70.95	-----	40.65	----	54.60	----
Planted with lister	45.50	-----	54.21	-----	39.73	----	46.48	----

* Planted with lister each year.

§ Planted with lister in 1903-1904, with surface planter in 1905.

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The method of listing early and splitting the ridges at planting time has, on the average, given slightly the most corn, or 1.78 bushels per acre over that not treated, but the difference is not enough to pay for the extra work. This is also the case with the other plots which had received extra treatment.

The shallow-plowed and harrowed plot in 1905 produced 3.37 bushels more corn than that on which the ridges were split at planting time. Where the ground was listed early and the corn planted in the old furrows, 5.97 bushels more corn per acre was produced than on the plot where the ridges were split.

The table shows however, that with the different treatments, the production varies with the season. In the test of listed vs. surface planted corn, the difference is 8.12 bushels, or 18 per cent, in favor of the latter. In some localities or in drier seasons the results would probably be reversed.

In very windy summers it is found that listed corn is not blown down so much as surface planted corn.

In dry seasons the extra cultivation of the soil would probably have paid well.

In level planting it is a safe method to follow to plow the ground in the fall and cultivate as needed in the spring until planting time. This may be done with a harrow or disc, and will not only serve to kill weeds but will help conserve the moisture and improve the texture of the soil as well. After planting it is a good plan to harrow the ground once or twice before the corn comes up.

Time of planting.

The time of planting varies with the season. In a late spring the planting cannot be done as early as in an early season. The planting

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should be done as soon as the danger of frost is past, preferably a little early rather than too late.

Depth of planting.

The depth of planting should depend upon the moisture content of the soil and upon whether the seasons are generally dry or wet, which will vary according to the locality. In general the corn should be planted at such a depth as to secure the best conditions for germination, moisture, heat, etc. From one to two inches is about right. In wet seasons planting at a depth of three to four inches may cause the corn to rot, while in dry seasons deep planting may give the best results.

Before planting the planter should be tested with the seed proposed to be planted. If the seed is uniform, the planter should be made to drop a uniform number of kernels. If the seed is not uniform no planter will drop it correctly. After the butts and tips of the ears have been discarded and the irregular kernels selected out the chances of a good stand depend upon the planter. The planter should be so adjusted that it will drop the desired number of kernels at least 93 to 96 times out of a hundred. If none of the plates will do this, one should be altered until it will.

The thickness of planting depends upon the purpose to which the crop is to be put, if for fodder the corn should be planted thick, while if the production of grain is the object, better ears and more corn can be secured by a thinner stand. The thickness of planting also depends upon the fertility of the land.