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Definite Corn Breeding Plots

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DEFINITE CORN BREEDING PLOTS

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There is no certainty among plant breeders as regards the origin of the corn plant. Certain authorities claim that corn originated in Mexico from a cross between gama grass and teosinte grass. Others say that corn probably originated by a cross between a sport of teosinte grass and the original plant. Regardless of the origin of the corn plant we are very sure that great strides have been made in the development of the corn plant and there is no reason why we should assume that further development will not take place.

The Indians made wonderful advancement in the growing of corn. It is very striking to note the difference between the ancestors of the corn plant and the corn plant as grown by the Indians. It is also very striking to note the comparison of some of the earliest Indian corn with afew of our leading corn varieties in their presentstage of development.

No wild corn plant has ever been found. The corn plant as we have it today is the result of human effort to improve upon the grasses as they grew naturally and from which the corn plant developed.

It is very inconvenient for the corn grower to not be able to look at an ear of corn and estimate its production. No system has ever been devised making such a plan possible. Consequently, in order to know the production of any variety or strain of corn it is necessary to grow it and test it out.

A working knowledge of corn breeding work is a very important requirement of a successful corn grower. It is the aim of this circular to explain the common methods of corn breeding.

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A. The Simplest Corn Breeding Plot:

The average corn grower does not wish to take the time for accurate corn-breeding work. It would probably bring manifold returns for his efforts if he could only get in the habit of doing this work. A very simple method and also a very good method outlined by Hayes and Garber of the Minnesota Experiment Station is as follows:

1. (a) Give special attention to a part of the field or use a seed corn plot.
   (b) Plant and cultivate carefully, using the hill method and grow four stalks per hill.
   (c) Each fall before frost, select enough seed for the following year's seed plot, from stalks which give a good yield and which grow in four-stalk hills.
   (d) Discard only the very undesirable ears and store each selected ear in a careful manner.
   (e) Test all seed used for germination.

2. Save all good seed produced by the yearly seed plot to plant the general field.

3. Continue 1 and 2 each group season.

The above system is very simple and of course does not take a large amount of time and could probably be practiced by every corn grower very profitably.

B. The Ear-to-row Breeding Plot:

The corn grower is interested in selecting for seed those ears from the crop which will produce the type of plant desired and the highest yield per acre. As previously stated it would be convenient if the corn grower could select the highest yielding corn by its general appearance.

It is not always the large well proportioned ear that one would pick when selecting from the crib that produces the highest yield. In many cases the superior looking ears have been produced under extremely favorable conditions. Probably they have grown in a hill of only one stalk instead of three or four, perhaps on some unusually fertile spot or under some natural conditions that were favorable to their growth. The merits of such ears will not, in all probability, be produced in the progeny unless planted under the favorable conditions that produced them. The only recourse of the grower is to plant the corn and see what it will do. This way of determining the yielding ability of individual ears is called the ear-to-row test.

The land to be used for an ear-to-row test plot should be uniform in fertility, well drained and alike, as near as is possible, in every respect. If a plot of ground is selected which is not even and not uniform in every respect, check rows should be planted every tenth row. However, we believe most South Dakota corn growers will be able to select good enough land so that check rows will be unnecessary.

It is very essential in the ear-to-row test plot to have a perfect stand. A good plan to follow is to plant about four kernels in each hill. When the plants are five or six inches high each hill should be thinned down to three hills but cutting out the weaker plants.

At harvest time each row must be husked separately and the yield is determined by weight for each row.

The following plan of an ear-to-row test plot is an attempt to simplify this practice but to not sacrifice good results. The details of the method are as follows:

1. Select 25 to 40 ears of the variety to be grown. If possible, select these ears in the field from those stalks which, if in a perfect stand, will give a good yield.

2. Make an ear-to-row test of these selected ears. Each ear is shelled by hand and kept separate. Only a part of this is used to plant the rows of the ear-to-row plot. The remainder of the kernels are saved and labeled to correspond with the row. This part of the seed saved from each ear is called the remnant of that particular ear.

3. From this ear-to-row test plot determine by actual weight of corn in each row the highest yielding rows.

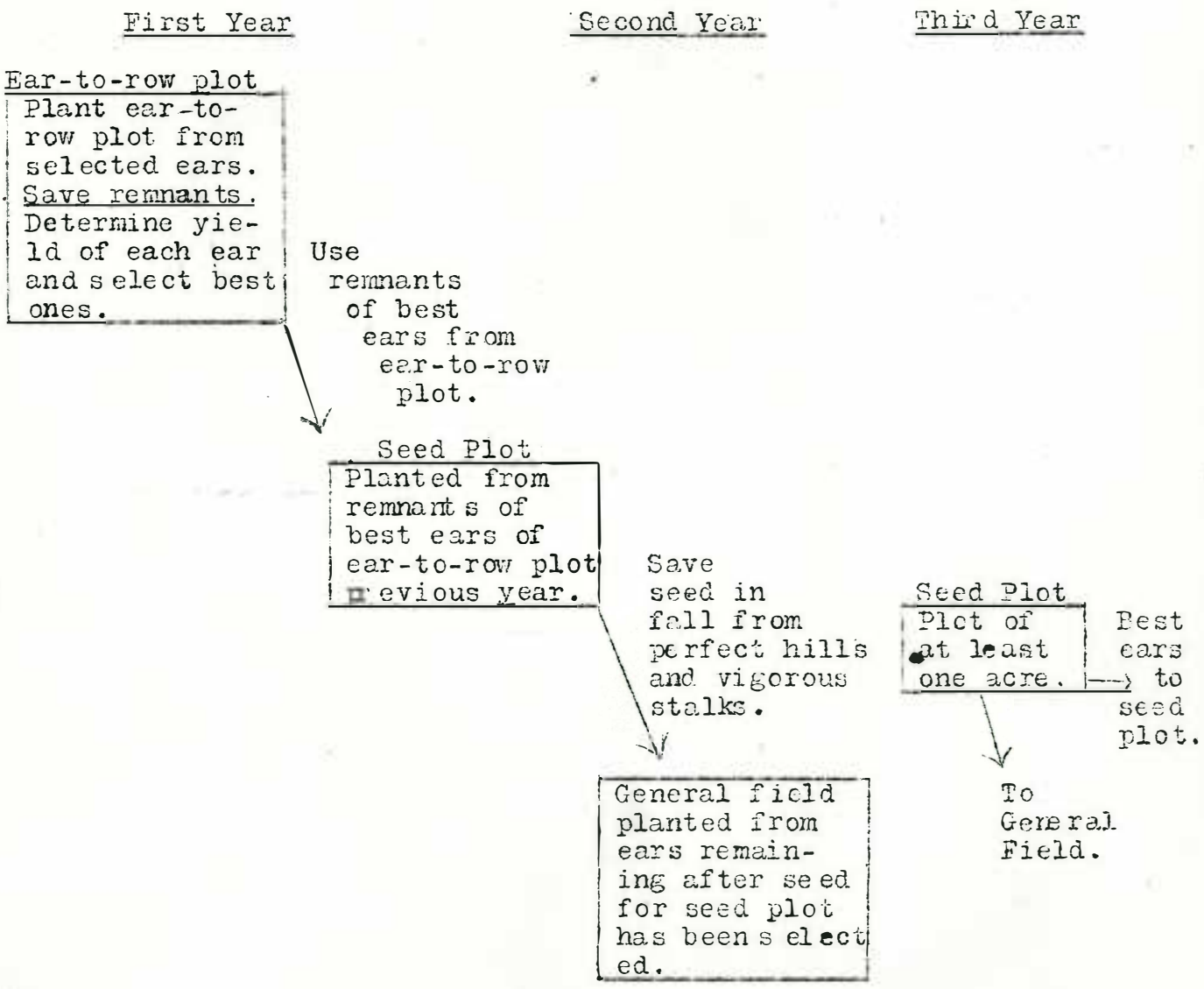
4. Mix the remnants of the highest yielding ears and plant in a seed plot the second year. Usually from 50 to 75% of the remnant ears should be discarded. That is, plant your seed plot the following year with the seed from the highest yielding ears, not to include more than 50% of the number of ears used in ear-to-row test plot.

5. The most desirable ears from the seed plot is your best source of seed for the general field the third year. Give special attention to a part of the general field so that a uniform stand may be obtained. Select enough seed, before a killing frost, from this part of the field for the entire field the fourth year.

6. Continue the method outlined under 5 for a period of four or five years and then use again the ear-to-row method as outlined in 1, 2 and 3.

DIAGRAM OF PROCEDURE FOR

EAR-TO-ROW CORN TEST SYSTEM



C. The "Sire and Dam" Breeding Plot:

A system sometimes used in corn breeding work includes the "sire and dam" breeding plot. After the highest yielding ears have been found by means of the ear-to-row test the remnants of those high producing ears may be used to furnish pollen for the seed plot. Such rows are called the "sire" rows while while all other rows in the plot are called the "dam" rows. All dam rows are detasseled and plants are fertilized from the sire rows. In this system seed is selected from the"dam" rows only.

D. The Best Breeding Plot to Use:

Each system of the breeding plots mentioned has its particular advantages. Under certain conditions one system is the best while with other conditions may require an entirely different system of breeding.

For the average farmer the"Simplest Corn Breeding Plot" outlined in Section A of this circular, is probably the most practical. Most all farmers could well afford to take the time for such improvement measures.

For the young corn breeder, interested in developing a pure line of seed the ear-to-row plan is the best. The breeder using this plan will learn more about his corn crop than under the simpler plan. If at a later time the ear-to-row breeder wants to intorduce "some new blood" he will be able to do so by the"sire and dam" method.