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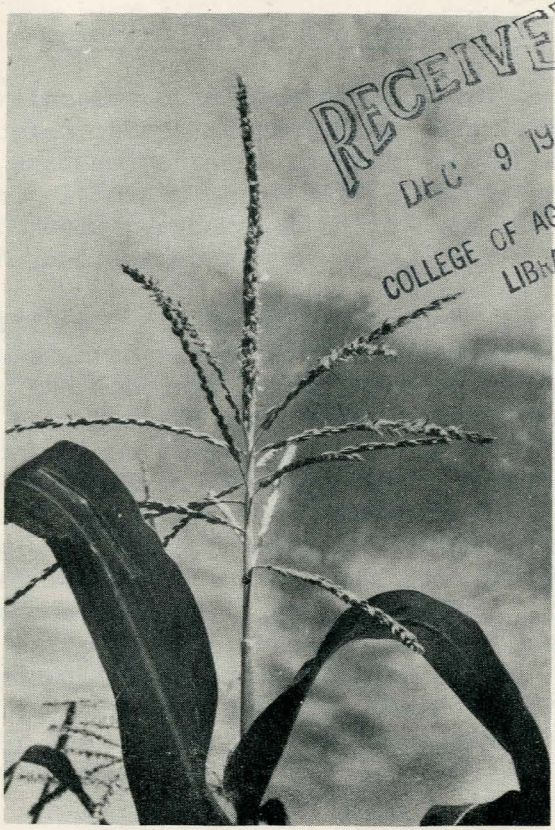

Cooperative Extens Home Economics
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Lincoln.

PRODUCING HYBRID SEED CORN IN NEBRASKA

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The production of hybrid corn seed is a highly skilled business which requires a thorough knowledge of the processes involved. Before starting hybrid seed corn production, considerable time should be spent visiting other growers who are well established, and in finding out what is needed to make it a success.

Selection of an Isolated Field

The selection of a desirable field is one of the most important steps in producing hybrid seed corn. Since the expense per acre is high, the field must be productive. It costs very little more to process 35 bushels of seed per acre than it does to process 20 bushels of seed per acre.

A field well isolated from other corn is necessary because corn pollen is carried by wind. Certification by the Nebraska Crop Improvement Association requires that a field producing hybrid seed corn be isolated not less than 700 feet from other types of corn (such as popcorn or sweet corn) and from corn of other colors (such as white and yellow). If the contaminating field is the same color and type of kernel as the seed field, then the distance between fields can be reduced to less than forty rods. This is done by using extra pollen rows on the sides of the seed fields exposed to the contaminating field. The use of extra pollen rows is shown in the following table as required by the Nebraska Crop Improvement Association for certification.

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The Use of Border Rows

Acres in Seed Field								: Number
9 or:							40 or:	: Border
Less:	10-14:	15-19:	20-24:	25-29:	30-34:	35-39:	Over:	Rows Req.
Minimum distance from other corn in feet								
700	680	660	640	620	600	580	560	1
600	640	620	600	580	560	540	520	2
620	600	580	560	540	520	500	480	3
580	560	540	520	500	480	460	440	4
540	520	500	480	460	440	420	400	5
500	480	460	440	420	400	380	360	6
460	440	420	400	380	360	340	320	7
420	400	380	360	340	320	300	280	8
380	360	340	320	300	280	260	240	9
340	320	300	280	260	240	220	200	10
320	300	280	260	240	220	200	180	11
300	280	260	240	220	200	180	160	12
280	260	240	200	200	180	160	140	13
260	240	200	200	180	160	140	120	14

In using the table to determine the number of border rows of pollen parent required, follow down the column indicating the correct acreage to the figure indicating most nearly the correct distance in rods from other corn. Then follow across to the extreme right column to find the minimum number of border rows necessary. This can be used only when the contaminating corn is of the same type and color as the seed production field.

It is important to have pollen rows shedding pollen simultaneously with silking of the seed rows. This is as important as good isolation.

Securing Seed Stocks for Hybrid Production

Those considering hybrid seed corn production should plan to produce hybrids best adapted to their locality, or the area in which they expect to sell seed. Seed stocks are generally sold by the thousand viable kernels, and will range in price from 40¢ to

$1.00 per thousand viable kernels (MVK), depending upon the ease or difficulty in producing that particular corn. "Viable kernels" refers to those kernels which will germinate.

In Nebraska, most producers plant ten tc twelve thousand viable kernels per acre, making their seed stocks cost from $5.00 to $12.00 per acre. Ten thousand viable kernels per acre will drop a kernel about every 15 inches in the row where a 42-inch row is used as indicated on the following table:

BASIS FOR DETERMINING NEEDS
OF PARENT SEED STOCK

Distance between kernels in the row:	No. Kernels Needed Per Acre Width of Row 40":	Width of row 42"
10 inches	15,682	14,935
12	13,068	12,446
14	11,201	10,668
16	9,801	9,335
18	8,712	8,297
20	7,841	7,467
22	7,128	6,789
24	6,534	6,223
26	6,031	5,745
28	5,601	5,334
30	5,227	4,978

Note: The above figures are purely mathematical calculations: These figures do not allow for extra seed for border rows, replanting, etc.

Example: A ten-acre field to be planted with a 42" width of row and kernels spaced approximately 14" apart. Ratio of one male row to three female or seed rows.

10 acres X 10,668 = 106,680 total kernels
106,680 ÷ 4 = 26,670 tassel or male kernels
106,680 - 26,670 = 80,010 female kernels

The common ratio of pollen rows to seed rows is two pollen rows to six seed rows. In this case, for every

crossing acre planted, 2500 viable kernels for seed rows would be required. The Nebraska Certified Hybrid Seed Corn Producers Association, 1745 North 33rd St., Lincoln, Nebraska, will provide additional information on seed stocks upon request. This organization has been delegated the responsibility of maintaining Nebraska foundation seed stocks.

Planting A Seed Field

Planting a seed field of hybrid corn is no different than planting other corn except that care must be taken to get the pollen and seed rows planted as desired without mixing the seed. The most common ratios of rows used are one pollen row and three seed rows, or two pollen rows and six seed rows. Obviously, the silks on the seed rows must be receptive at the time pollen is shed by the pollen row. If there is a wide difference in silking date of the pollen plants and seed plants, then there must be a difference in planting dates of the two to bring them together or make them "nick" properly at pollination and silking time.

The planting of the pollen rows and seed rows at different dates is not necessary for all hybrids. When different dates of planting are required, as much information should be secured by the producer as possible. The different planting date involves additional problems such as getting the best spread at pollination time, controlling weeds on two different planting dates, and securing stands.

Detasseling the Seed Rows

In order to insure cross-pollination, all the plants in the seed rows must be detasseled before they shed pollen. In this manner, the pollen from the pollen rows fertilizes the silks on the seed rows.

The tassels must be pulled as soon as they appear at the top of the plants and before they shed pollen.

Tassels must be pulled by hand either by walking through the field row by row or by riding on a machine designed to carry detasselers through a field. Tassels cannot be cut off satisfactorily. Usually the field must be gone over every day during the time when tassels are growing fast. The detasseling period requires two weeks or more. It has been found that one man can handle from three to five acres during the detasseling period.

The detasseling operation costs from $12.00 to $18.00 per acre. Some seed parents detassel easier than others, and a knowledge of plant characteristics of the various parents is helpful.

Husking and Sorting

The only corn saved for seed is that produced on the seed rows which have been detasseled. This must be kept separate from the corn produced on the pollen rows. Otherwise, the husking takes no longer than for ordinary corn. Corn from the pollen rows should be used for feed. A field picker works satisfactorily for hybrid seed corn. As it is picked, all husks remaining on the ears should be removed. This can be done by hand or by using husker rolls.

The corn can be sorted at the time it is husked. All ears which do not have typical characteristics of the corn grown should be thrown out. Also, diseased ears should be discarded as well as ears having considerable ear-worm damage. It is not necessary to butt and tip every ear since the corn will be graded later.

In the case of white seed corn production, it is difficult to get entirely away from yellow or lemon-colored kernels which may be scattered through the ear. These are caused by contaminating yellow corn pollen from surrounding fields. Pollen will drift a considerable distance and retain its viability if weather conditions are favorable. These lemon or

yellow kernels should be picked out of the seed after it is shelled; however, some smaller producers pick these out of the ear before shelling.

In the case of white-caps in yellow corn, these must be picked out in the ear since they cannot be detected easily after the corn is shelled. Not more than a maximum of one off-type kernel in a thousand should be tolerated.

Drying Seed Corn

When hybrid seed corn is grown in large amounts by a company or individual grower, some artificial drying method is necessary. It is folly to try to grow any amount of hybrid seed corn in Nebraska without artificial drying facilities.

When artificial drying is possible, this means that the corn may be taken out of the field with a moisture content of 25 to 30 per cent and dried down to 12 to 14 per cent moisture in three to four days. This can be done without damage to the vitality of the seed. This means that harvesting can be started earlier, and all of the corn dried before heavy freezes occur.

There are many different types of artificial dryers. Most dryers use forced hot air supplied by a gas or oil-burning furnace. The hot air is regulated by a thermostat, not to exceed 110 degrees, and is forced through the specially prepared corn cribs.

Shelling and Cleaning

After the corn is dry, it is shelled and cleaned. The sheller should be carefully adjusted to avoid cracking and damaging the seed. Many small producers use a one-hole sheller. Where large quantities of seed are produced, larger shellers are required. After shelling, the seed must be cleaned to take out chaff, cobs, and other foreign material.

Grading

Grading hybrid corn is a means of placing all similarly shaped kernels together, or separating round kernels from the flat kernels. There are three common types of graders used: gravity graders, width and thickness graders, and length graders. The important thing to consider in grading is to run the equipment slowly enough to grade the seed adequately.

Gravity Graders are not used by all producers of hybrid seed. They have been found useful by many after cleaning shelled seed. The gravity grader takes out much of the cracked and rotten kernels which are still in the seed. Where large amounts of seed are processed, gravity graders save considerable time in the hand picking process and save in the amount of good seed lost.

Width and thickness of kernel graders are used by all producers of hybrid seed. This process separates round and flat kernels. The four most common grades produced are large round, large flat, medium round, and medium flat. Suggested specifications for length and thickness of kernels are found in the following table. Some deviations from this may be made from year to year.

SUGGESTED SPECIFICATIONS FOR
NEBRASKA CERTIFIED HYBRID SEED CORN

Grade	Screens
Large Round	Over #20 or 21 round, and through a #24 round.
Medium Round	Over #16 or 18 round, and through a #20 or 21 round.
Large Flat	Over a #20 round, through #24 round and through a #15 slot.
Medium Flat	Over a #18 round, through #20 or 21 round and through a #13 slot.

Extra Large Flat	Over a #24 round, through #28 round and through #15 slot. (Seed of this grade will be obtained only from some hybrids in some years.)
Small Flat	Over a #17 round, through #18 round and through a #13 slot.

DISCARD ALL CORN that will pass through a #16 round and all large kernels that will not pass through a #24 round.

(All screen numbers refer to 64th of an inch, e.g., #11 is 11/64 inch and #20 is 20/64 inch, etc.)

There are several different types of width and thickness grades. Many use a series of cylinders which have various sizes of round holes for round kernels, and slots for flat kernels. These revolve and each kernel finds its respective grade as it moves through the cylinder. Others use graders which have a series of sieves equipped with holes and slots. These sieves shake back and forth, thus obtaining the desired grade. All of these different types have done the job successfully, the greatest difference being in the volume of corn which can be graded per hour.

Length graders are becoming generally used by hybrid corn producers. These graders are used after the corn has been graded for width and thickness. This may subdivide one grade into two grades. For example, in large flats, there would be a large flat, long kernel size and large, flat, short kernels. The two grades would be the same in width and thickness. Length grading does two things--it makes the seed more uniform makes it appear more attractive, and it permits more uniform planting.

The whole hybrid corn production program is highly competitive and some believe that grading of the seed has been carried further than necessary for all practical purposes.

Seed Treatment

Most hybrid seed is treated to control seed-borne organisms. The main reason for treating seed corn is to insure better stands. In some years, adverse weather conditions prevent rapid germination, and untreated seed will rot in the ground before it has a chance to grow. Since the cost is small, the protection of hybrid corn seed (by treatment) against invasion by soil organisms which cause seed rotting is desirable. Several different seed treatments may be used. For information on types of seed treatment, write to the Plant Pathology Department, College of Agriculture, Lincoln, Nebraska.

Merchandizing

The merchandizing of hybrid corn seed has become highly competitive. Those who produce seed must have a dependable retail or wholesale outlet. There is still room for good producers of Nebraska Certified hybrid seed corn, but those going into the business must be in a position to provide necessary equipment to put out high quality seed. After high quality seed is produced, the producer must have the ability to get out and sell his product.