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HYBRID SWEET CORN STRAINS AND VARIETIES

by

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In the last few years there has been considerable interest among seed breeders, commercial growers of vegetables, and home gardeners in hybrid strains of sweet corn, chiefly on account of the unusual uniformity of size, shape, and maturity of the ears, as well as greater yields. These hybrids are the result of crossing inbred strains of certain varieties of sweet corn, as in the case of the hybrid Golden Cross Bantam, which was developed at Purdue University, Indiana, by crossing two inbred strains of Bantam--Purdue Bantam 39 and Purdue Bantam 51. This hybrid was released to seedsmen and canners in 1933.

Since the first publication of this station regarding hybrid sweet corn in December, 1933, a considerable acreage of hybrid sweet corn has been planted in Oregon for canning, freezing and city marketing. This circular replaces the former publication, "Circular of Information No. 92," and discusses the characteristics of various hybrids, top crosses and varieties that have been under observation during the past five years.

How hybrid corn is obtained. Sweet corn hybrids are produced by first breeding inbreds and then crossing the inbreds, or in the case of the top crosses, as discussed below, but one inbred strain is used as a parent. Inbred strains of sweet corn are produced as follows: Plants of superior appearance are selected in the field as a whole and paper bags are placed over the ears of each plant before the silk appears. After the silk emerges and the tassel is shedding pollen, another bag is tied over the tassel and allowed to remain over-night. The next day the protected silk is fertilized with pollen from the same plant by transferring the pollen from the tassel to the ear on the same plant. Next year the superior plants in the inbred rows are selected and are inbred again. After this inbreeding and selection is continued for several years, the plants grown from any one inbred ear are much more uniform in all characters than any open-pollinated variety. Each inbred strain is also different from all others.

Crossing inbreds is the next step, particularly to find a combination of inbreds that will give the best results. Single crosses of inbred sweet corns are made by planting a certain number of rows, usually three to four, of the seed parent strain to one of the pollen-bearing parent. The plants of one strain are detasseled and seed is saved from the detasseled plants. For producing hybrid sweet corn seed, therefore, it is necessary that there be a yearly continuation of breeding single inbreds and also crossing these inbreds so that the hybrid seed may be of the first generation cross between the two inbred strains.

Double crosses are produced by taking first generation hybrids resulting from two single crosses, which are then crossed together; therefore, a double cross strain will have four inbreds entering into it. Three way crosses are those in which three single inbreds have been crossed or a single hybrid will again be crossed with another inbred, making it a so-called three way cross.

Top crosses. Some of the strains of sweet corn are offered as top crosses. In growing a top cross an inbred is used as a male parent and the regular variety, open pollinated, as a female instead of using the two inbreds, as in the case of the single hybrid previously described. In the case of the top cross, therefore, only one of the parents is an inbred strain, consequently there is liable to be more variation in the top crosses than the hybrids, in which two inbreds are the parents.

Do Not Save Seed From Hybrid. Growers of sweet corn hybrids are often inclined to save some of the attractive uniform hybrid ears for seed. They should consider the fact that the seed from the hybrids is not pure for the different characters except those that are common to both parents, and therefore, the plants grown from the second generation seed are more variable, usually less vigorous and less productive than those of the first generation hybrid. A grower cannot select seed from a crop of an inbred cross and expect to reproduce the same results as in planting newly crossed seed. It is, therefore, necessary for the sweet corn grower to go back to his seedsman each year for a necessary supply of hybrid seed.

Ordinary sweet corn seed from open-pollinated fields costs about 16 to 17 cents a pound, and if 10 to 12 pounds of seed are planted per acre, the cost of seed per acre would be between \$1.60 to \$2.00. Hybrid sweet corn seed is expected to cost about 30 to 35 cents per pound in 1937, thus entailing a cost of \$3.00 to \$4.00 per acre. The difference between the two seed items is but \$1.40 to \$2.00 per acre which should be reimbursed several times by the increased yield of the hybrid corn over that of the open pollinated variety. The Experiment Station may be able to suggest sources of seed.

Recent developments in hybrids. When hybrid sweet corn was introduced a few years ago, there were but two or three varieties developed, among the most important of which was Golden Cross Bantam. Since the introduction and wide use of this variety a large number of hybrids have been propagated in which inbred lines of different varieties have been used. So many different hybrids and crosses of various kinds have been developed by breeders of late that the grower may be more or less bewildered by the number that he may find listed in seed catalogs. The mere mention of the word hybrid sweet corn now includes an increasingly large number of two-way crosses, top crosses, triple and four-way crosses and there is apparently no end to the possible development of crosses of one strain or variety with another. These strains differ in color of kernel, number of days to the first harvest, length and diameter of ear, and number of rows of kernels and many other characters.

The tendency of breeders has been to propagate earlier strains in view of the fact that the first hybrid introduced, namely Golden Cross Bantam, is quite a number of days later than the open-pollinated varieties of early sweet corn. Most hybrids, as a matter of fact, are a few days later than the varieties

from which they were developed and few, if any, of the hybrids are as early as the earliest varieties. In some of the early top crosses, there is little difference between their season and that of the original parent. It is entirely possible that within a relatively short time hybrids will be developed that are as early in season as the earliest varieties.

It is probable that at the present time there are as many different strains of hybrids as there are varieties of open-pollinated corn. It is likewise important that the grower of sweet corn who buys hybrid seed realizes that strains of one hybrid may vary to a considerable extent in yield, uniformity, and trueness to type. For example, in a test of 8 strains of Golden Cross Bantam, the number of ears per acre varied from 12,000 to 16,600 and the tonnage of green corn from 4.3 to 6.2 tons. As in the case of open-pollinated varieties, therefore, it is emphasized that the hybrid is good only in proportion to the knowledge, skill and care that goes into its breeding and seed production and that the purity and performance of the hybrid are directly influenced by care taken in breeding the inbred parents, crossing the strains and preventing contamination with other lots of corn.

#### Open-Pollinated Varieties

The varieties listed herewith are not inbred. Some may be varieties of crossed corn, such as the first variety named, but the parents of the cross are not inbreds.

Golden Early Market. One of the largest of the early varieties, being approximately 80 days from seeding to harvest. It is a crossed corn but not an inbred hybrid, the parents of Golden Early Market being Golden Bantam and Early White Market. It is about 12 to 14 days earlier than Golden Bantam. The ears are large and generally twelve rowed.

Golden Gem. Also one of the earliest yellow kernel varieties, and generally about 78 to 80 days to harvest. The ears are eight to ten rowed, small to medium sized, with excellent quality. In field trials this variety produced a high number of marketable ears per acre.

Spanish Gold. In trials was about an 85-day variety, producing small to medium, fine quality ears mostly ten to twelve rowed. Not a heavy producer and yielding in trials but 66% marketable ears of a good strain of Golden Bantam.

Golden Sunshine. This variety was 84 to 87 days reaching a state of first harvesting; ears large, yellow, and twelve rowed, but there was considerable variation in ear characters and the yield of ears per acre was comparatively low, being less than the best strain of Golden Bantam.

Golden Bantam. Strains vary considerably in season, character of ears, uniformity, and yield. Most Bantam strains take 85 to 92 days to harvest. Ears vary from 8 to 12 rows of kernels, small to medium sized, and generally the strains are quite highly productive with a fair to moderately good percentage of marketable ears; quality excellent.

Golden Giant. This is a crossed corn between Golden Bantam and Howling Mob, but it is not an inbred hybrid; plants large; ears large, but rather late, being about 102 to 105 days to harvest; a fine variety for a main or late crop.

Bantam Evergreen. A crossed corn between Golden Bantam and Stowell's Evergreen but not an inbred hybrid. Slightly later in the season than Golden Bantam. The ears are usually 12 to 16 rowed, 8 inches long and the plants moderately productive.

#### Top Crosses

As previously stated, top crosses consist of the progeny resulting from the cross of an open-pollinated variety, such as any of the varieties just mentioned, as the female parent and an inbred line of a variety as the male parent. Spancross P.39, for example, is a cross of Spanish Gold and an inbred strain Purdue 39 which is one of the parents of Golden Cross Bantam.

The number of top crosses that have been developed of late has been large. Some have shown distinctly greater uniformity and larger yields than the open-pollinated variety from which the top cross was made, but others have been inferior.

In view of the large number of top crosses that have been bred and only a few of which have been tested at Corvallis, the number here discussed will be confined to a few examples.

Gem Cross P.39. This is one of the earliest top crosses, being about 82 to 85 days to harvest, mostly 10 to 12 rowed. This variety was reported on favorably in cooperative trials in Clackamas County.

Spancross P.39. A top crossed Spanish Gold and also one of the earliest hybrids, about ten days later than the original variety but larger, more uniform and productive of a greater yield and a higher percentage of marketable ears; 8 to 12 rowed.

Suncross P.39. This is a top cross of Golden Sunshine with Purdue 39, but later in maturity than the two previous top crosses. In cooperative trials in Clackamas County it was approximately 98 days to time of first harvesting.

Bancross. (Top Cross Golden Bantam) There are a number of different strains of top crosses of Golden Bantam, depending on which inbred has been used as the male parent of the top-cross. A few days later than Golden Bantam. In Corvallis trials did not exceed in number of ears the best strain of Golden Bantam.

#### Hybrids

Golden Cross Bantam. This is the first introduced and most widely grown of the inbred crosses. It is a single cross produced by crossing two inbred strains of yellow corn, both products of the United States Department of Agriculture and the Indiana Agricultural Experiment Station. Its history and description are given in the circular named below.

In field tests on the Experiment Station grounds at Corvallis there was an unusual uniformity of height and vigor of plants as well as length and diameter of ears. An excellent ear of this first generation hybrid was 8 inches long, 2 inches in diameter at the butt end, 12 rowed and weighing unhusked, approximately 9 to 10 ounces. There were comparatively few culls in the population of ears. The plants are unusually vigorous and uniform in growth and there is greater uniformity of maturity of the ears than is ordinarily found in open-pollinated varieties. Season later than the early varieties and early top-crosses being about 100 days to harvest.

Valuable for a main crop and for canning. Now generally grown in various districts of the state for delivery to canneries and freezing plants. Because of the larger foliage and generally greater vigor of the plant, it does best when grown in good soil and preferably with irrigation under which circumstances it is not uncommon to obtain a yield of 5 to 6 tons per acre.

Kingsorost. This hybrid is an example of a double cross of inbred strains of Golden Bantam, two single crosses of inbreds being crossed with each other. In tests at Corvallis, a typically good ear of Kingsorost measured from 7 to  $7\frac{1}{2}$  inches in length, and  $1\frac{1}{2}$  inches at the butt end, strictly 8 row, being very uniform in this respect. There was a pronounced uniformity of this hybrid in ear characters in general. Season early, being several days earlier than Golden Bantam.

Additional Publications on Hybrid Sweet Corn.

Golden Cross Bantam Sweet Corn. Circ. 268, U.S.D.A., Washington, D.C.

The What and How of Hybrid Corn. Farmers' Bul. No. 1744, U.S.D.A.

(These two publications may be obtained at a price of 5¢ each from the Supt. of Documents, Washington, D.C.)

Suckered and Unsuckered Sweet Corn. Circ. of Information No. 115, Oregon Agricultural Experiment Station, Corvallis, Oregon.

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