DETASSELING DOOM

Hybrid seed corn research will do away with need for 125,000 seasonal workers who do job by hand.

By Jeanette Fessenden, '56

AMONG the diverse research projects presently underway at the University of Missouri's College of Agricutlture is the incorporation of the male sterile method of producing hybrid seed corn.

In order fully to appreciate the significance of the research being conducted by Research Associates Marcus S. Zuber and Clarence O. Grogan it is necessary to understand a little about the production of hybrid corn itself.

Since hybrid corn was first developed in 1908, it has added literally billions of dollars to the national income. The yield per acre of the corn crop in the United States has been increased by 20 per cent—with no additional labor. The original hybrid "single cross" was discovered almost simultaneously by George H. Shull at Cold Spring Harbor and E. M. East of the Connecticut Agricultural Experiment Station. Donald F. Jones later developed the so-called "double-cross" by crossing two single crosses. The use of the "double cross" method made seed production less expensive. Our present day hybrid corn is from seed produced by the Jones method.

Each year in the United States over 60 million acres of hybrid corn are planted, requiring about eight million bushels of seed. A major problem in the production of this seed is the removal of the tassels of the female corn plant in a crossing field, to prevent the pollen from the female plant from pollinating itself, resulting in offspring that would lack hybrid vigor and have less yield. Tassel removal, by hand, on a scale sufficient to produce eight million bushels of seed, is an operation of considerable magnitude.

Each summer the hybrid seed corn industry must find and train thousands of casual laborers for this purpose. One seed firm alone employs more than 20,000 laborers for the detasseling season. On the peak day of the season, it has been estimated that some 125,000 persons in the United States are engaged in removing tassels from corn plants. When there are labor shortages, or when rainy weather prevails during the detasseling season, the producer of hybrid seed corn has a serious problem on his hands, and the quality of his product may suffer from unavoidable self-pollination.

Over the past 30 years, numerous corn breeders have conducted experiments toward the discovery of some method of avoiding or eliminating the operation of detasseling in the production of hybrid seed corn. The technique of the male sterile method was suggested by Richey and Sprague in the early 30s but the breeding material they used at that time did not always give male sterile plants under all types of environmental conditions. The method was finally perfected by Jones of Connecticut, Mangeldorf of Harvard and Rogers of Texas working jointly and in-

dependently on the experiments.

Research Associates Zuber and Grogan explain the incorporation of the male sterility and restorer genes into old and new hybrids is proceeding as rapidly as possible. With plantings in Florida in addition to the University's greenhouses, Missouri's scientists are able to produce two generations a year. Within three years a number of new hybrids will be made and they predict within a decade detasseling will have become an obsolete practice.

Today, agricultural scientists can produce new combinations and variations of plant life with the same precision that machinery for useful purposes is produced by the mechanical engineer. When the labor of 125,000 workers can be eliminated by the development of a new variety of living organism, the modern phenomenon of automation is no longer solely within the realm of the inanimate.

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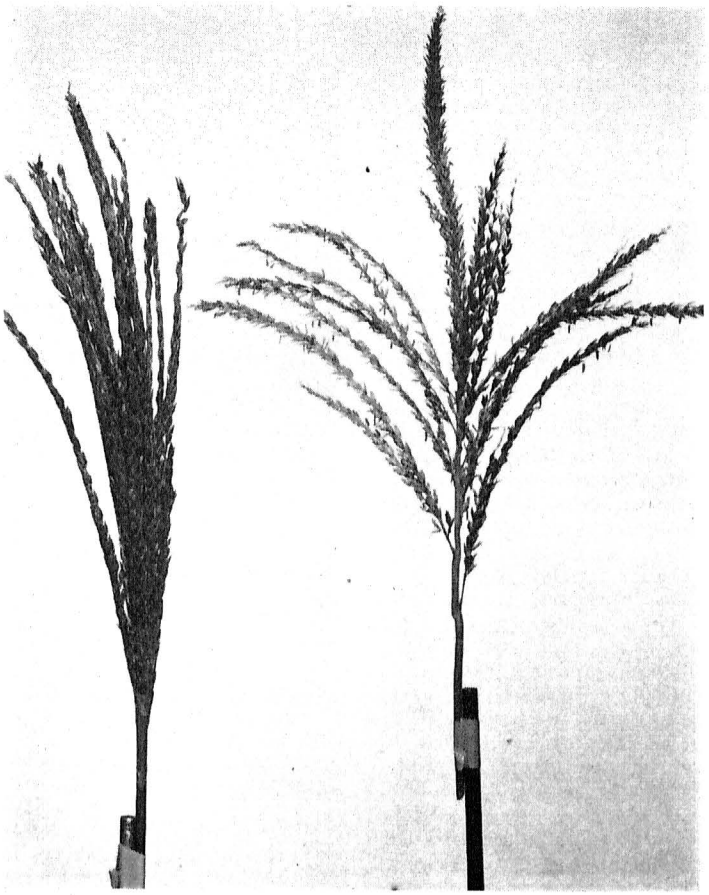
The following technical information is supplied by Dr. Zuber and Dr. Grogan:

With the introduction of male sterility into certain inbreds, it is possible to produce hybrid seed without detasseling. This is accomplished by making one inbred line of a double cross cytoplasmic male sterile. For example, in the double-cross US 13 (WF9 x 38-11) (L317 x Hy), pollen from the inbred WF9 would be used in crossing with certain sources of cytoplasmic male-sterile stocks. One such stock commonly used is known as the Texas source which was found in the open-pollinated variety Mexican June. This F1 single cross will not produce functional pollen as the genes for fertility from WF9 are incompatible with the cytoplasm from the Texas stock. Not all inbreds will be completely sterile when crossed on this stock and the F1 crosses will range from completely sterile to partial or complete fertility. By continuous back crossing, *i.e.*, by crossing sterile plants in successive generations with WF9, a sterile WF9 will be developed. Usually this can be accomplished in 5 to 7 generations. Seed for the male sterile WF9 cannot be maintained without crossing to the original WF9. When the male sterile WF9 is crossed with 38-11, the resulting F1 is sterile and will not require detasseling. There are certain inbred lines with pollen restorer genes. Whenever these inbreds are used on male sterile lines, the resulting F1, cross produces functional pollen. Such genes are necessary in the male single cross of a double cross to insure adequate pollen in the commercial crop. At the present time pollen restorer genes are being introduced as rapidly as possible into the male single cross parents of hybrids, but until they are introduced, it is necessary for seed producers to blend seed of a hybrid produced by the male sterile method with seed of the same hybrid produced by the conventional method. The most common procedure is to plant 4 of the 6 female single cross rows with male sterile single cross seed and the other 2 with its fertile counterpart. Only the latter 2 rows will require detasseling, thus reducing detasseling 66⅔%. At harvest the seed is bulked and the processing operations such as drying, shelling, and grading are handled as one unit to insure satisfactory blending. The use of the cytoplasmic male sterile method reduces the cost of production to some extent but more important is its convenience to the seed producer. Detasseling is a task that must be performed regardless of weather and often it is quite difficult to obtain workers who will work under all kinds of weather conditions.



The corn tassel on the left is a male sterile (it produces no functional pollen) while the tassel on the right is the fertile type.