

## FUNK SEEDS INTERNATIONAL

Bloomington, Illinois

Cytoplasmic male sterility research: M<sub>3</sub> generation from streptomycin treatments — Since the initial report (MNL 47:35-37) on treating maize seeds with streptomycin, there has been a generation-to-generation report. The principal objective of this research was to induce cytoplasmic male sterility in an inbred line. As reported last year (MNL 48:32-35), male sterile plants were obtained. The sterile plants were sibbed within the row, and these progeny were grown out this past summer. Many of the rows had plants that segregated for sterile:fertile plants. Some rows had plants that were all fertile. No rows had plants where all plants were sterile. The best genetic ratio to explain the results seems to be 1:1 for sterile:fertile plants since from the rows that segregated for sterile plants, the overall average was 45% steriles. This could be due to at least two things:

(1). A nuclear gene for male sterility in the heterozygous condition was present in some of the seeds that were initially treated with streptomycin. This gene segregated after selfing, and these plants were sibbed within the row by fertile plants which were either homozygous or heterozygous for genic male sterility. Homozygous plants used as the pollen source produced rows that were all fertile, and plants heterozygous for the male sterile gene used as the pollen source gave progeny segregating approximately 1:1 for sterility:fertility. If this is the case, it assumes that no cytoplasmic male sterile mutants were induced and only that spontaneous genes for male sterility were occasionally in the heterozygous condition in the seeds that were initially treated with streptomycin.

(2). Cytoplasmic mutants for male sterility could have been induced but the inbred population was segregating for restorer genes, which allowed the 1:1 ratio for sterility:fertility (MNL 47:35-37). To examine this theory further, as many as possible of the male sterile plants in each row were each crossed by pollen from any inbred in our field laboratory that had pollen available. Also, as many inbred pollen parents as possible were used on the sterile plants in each row. This was done in an attempt to bring in some non-restorer genes. This material will be grown in the next generation to observe for male sterile progeny.

This work has been continued using treatment procedures basically similar to the original report (MNL 47:35-37). In addition to streptomycin we are using erythromycin, acroflavine and ethidium bromide on maize seeds in an attempt to induce cytoplasmic male sterility.

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Chemical pollen control by DPX 3778 — This compound is being evaluated for its ability to prevent pollen shed and thus facilitate hybrid corn production.

DPX 3778, an experimental compound from E. I. Dupont De Nemours and Company, Inc., was applied to inbred A632Ht as an over-the-top spray at rates of 0.06, 0.12, 0.25, 0.50, 1.0, 2.0 and 4.0 pounds/A at daily intervals beginning 30 days prior to anticipated pollen shed.

DPX 3778 at 1.0, 2.0 and 4.0 pounds/A applied 30 days prior to pollen shed induced a plant growth regulator response in the form of staminate production of silks and kernels in addition to normal ear development. DPX 3778 at 4.0 pounds/A produced undesirable plant growth for the duration of the experiment, ranging from bent or curved tassels when applied 5 days prior to pollen shed to the severe malformation already described at 30 days before pollen shed.

The maximum time interval between application and pollen shed for sterilization at the various rates tested was approximately 7 days at 0.5 pounds/A, 21 days for 1.0 pounds/A and 30 days for 2.0 and 4.0 pounds/A. The lower tested rates of DPX 3778 at 0.06, 0.12 and 0.25 pounds/A were ineffective in preventing pollen shed. Untreated plants shed pollen from two to ten days earlier than plants treated with 4.0 pounds/A. No data on ear morphology were obtained.

A water application study was conducted in which DPX 3778 at 1.0 and 2.0 pounds/A was applied to A632Ht as an over-the-top treatment at spray volumes of 5, 10, 20 and 40 gallons/A when tassels were beginning to show. Application of the compound at 1.0 and 2.0 pounds/A prevented pollen shed and was equally effective at all spray volumes. No immediate symptoms of phytotoxicity were observed with 1.0 or 2.0 pounds DPX 3778/A; however, one or two percent of the plants sprayed with 2.0 pounds/A remained permanently bent following windy weather (20 mph) five and six days after application. Untreated plants reached ten percent silk stage two to five days earlier than plants treated with 1.0 or 2.0 pounds/A DPX 3778.

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Bicentennial corn — There will be interest across the United States regarding the Bicentennial Birthday of our nation in 1976. A bicentennial O. P. variety of corn (Carswell White) that has been maintained by the Carswell family for 200 years was compared in 1974 with two hybrid checks.

The average yield of the hybrids was 52% more (130.6 vs 86.0 bu/a) than the Carswell White. The hybrid checks also yielded an average of 61% more corn than seven other long-time O.P. varieties of the Southeast. The average percent of