cytoplasms are the result of a single alteration in the cytoplasm rather than the result of two independent genetic defects. In other words, there is no evidence that the Texas-type cytoplasmic male sterility can exist separately from sensitivity to H. maydis race T and to its pathotoxin.

S. J. Gabay
J. R. Laughnan

3. Growth of pollen from various inbred line and F_1 sources on Cook and Walden basal medium.

In the course of studies on the reaction of germinating maize pollen to Helminthosporium maydis pathotoxins (MGCNL 47: 49, 1973; Crop Science 13: 681, 1973) many inbred lines and their different cytoplasmic versions were tested along with some F_1 hybrids. As one of the controls in these studies, we used the Cook and Walden basal medium (CWBM) (Can. J. Bot. 43: 779, 1965), the only modification being an increase in agar content from 0.7 to 1.0%. It was noted that inbred lines vary widely with respect to growth of pollen tubes on CWBM. Since information on the performance of inbred line pollen may be of use to those studying the physiology of maize pollen or other phenomena involving pollen germination, we report here the relative performance of 30 inbred lines in classes ranging from poor to excellent.

Eight inbred lines were noted to have excellent pollen germination on CWBM: W23, Mo17, CI21E, Oh51A, N6, Hy2, C103, and B14. Pollen germination of six inbred lines was good: 38-11, NY821, AyX187Y-2, CE1, Oh43 and A632. Eleven lines exhibited satisfactory pollen germination on CWBM and, while they were not outstanding, they could certainly be used in pollen germination studies: SK2, R138, Ky21, B37, Oh07, Tr, N28, K4, K61, N28 and A619. Pollen from five inbred lines tested grew poorly on CWBM; WF9, W64A and Oh545 gave consistently poor germination while M14 and K55 varied somewhat but usually grew poorly.

The three commercially available F_1 hybrids, C123/C103, B37/B14A and A619/Oh43, gave good to excellent pollen tube growth on CWBM. While pollen grains obtained from F_1 hybrid plants vary in genotype, these sources may nevertheless be useful for some studies.

The restored cms-T versions of most of the inbred lines and the three F_1 hybrids mentioned above were also available and their pollen was tested on CWBM. Pollen from restored cms-S and cms-C versions of some of the inbred lines was also tested. These studies indicate that conversion to male-sterile cytoplasm does not appreciably alter the performance of inbred line pollen on CWBM.

S. J. Gabay

4. Linkage analysis in the male gametophyte.

As indicated in one of the above reports, we are attempting, through use of the waxy translocation technique, to identify the linkage groups of newly-arisen genic restorers of S male-sterile cytoplasm. The conventional procedure would be laborious as there are no less than six restorers to deal with and it would be necessary to score relatively large testcross progenies for a mature plant trait, male sterility. We propose to simplify the task by taking advantage of the fact that genic restoration of S cytoplasm occurs at the gametophytic level. Since plants with S cytoplasm that are heterozygous for a restorer gene produce equal numbers of normal (Rf) and aborted (rf) pollen grains, it should be possible to obtain at least a preliminary indication of the linkage group for a particular restorer through analysis of iodine-stained pollen samples from plants heterozygous for both the restorer and a particular wx-linked reciprocal translocation.

The procedure involves an initial cross of a plant with S cytoplasm that is heterozygous for a genic restorer, as female parent, with a plant that is homozygous for wx and a particular reciprocal translocation. The male parent in the cross should be in Ml4 background as this inbred line does not restore S. All F_1 offspring should be heterozygous for the translocation and approximately half of these, having received the rf allele from the female parent, should be male-sterile. The remaining half, those carrying the restorer allele from the female parent, should be semi-sterile, with about 25% normal pollen grains. If a particular restorer gene being tested is located on a chromosome other than the two that are involved in the waxy translocation carried by the male parent, blue and red staining normal pollen