and testcross ears gave a 1:1 segregation for yellow green and green seedlings.

Yellow green plants were crossed by each of the A-B translocations (MNL 45:144) and plantings made from the resulting seeds. All of the ears gave a 1:1 segregation for yellow green except the cross by TB-10c, which had 69 green, 29 yellow green and ten pale yellow seedlings. The pale yellow seedlings appeared to be hypoploids, thus indicating that the mutant has a yellow seedling phenotype when hemizygous.

These results indicate that the mutant is a dominant yellow green in heterozygotes and a lethal yellow in homozygotes and hemizygotes and that it is located on the short arm of chromosome 10. It is tentatively designated as $\underline{Yg_4}$.

M. G. Neuffer

5. Tan necrotic.

Two cases in which the mutant seedlings emerged with tightly rolled leaves were found in the EMS progenies. When the leaves were unrolled, they were found to be tan in color with uniformly spaced bands of dark brown tissue. A slight amount of chlorophyll appeared on the coleoptile and underlying leaf sheath at soil level. The seedlings grew very little and died in a few days. A good but not exclusive test by existing A-B translocations failed to uncover either mutant.

M. G. Neuffer

6. Pale green spotted.

Several cases characterized as pale green with fuzzy dark green spots have been found in EMS, NG and mutator system progenies. One of these (pgs, E-464), which was found in an EMS-treated culture and has been located on the long arm of chromosome 2, can be described as an example. The seedlings emerge as a moderate pale green with good vigor. At about the 2 leaf stage, small fuzzy spots of dark green (slightly larger than a pin head) appear and increase in number until there may be 40-100 on a leaf. Occasionally a spot may be much larger, in which case it will be elongated, conforming to the pattern of cell lineage of the

leaf. The border of the spot, however, is still fuzzy, as though a precursor for normal chlorophyll were diffusing into the light green tissue. Mutant seedlings lack vigor and rarely grow to maturity even under the best of culture conditions. A second such mutant (pgs, M-21) appeared in a mutator system progeny and has been located in the long arm of chromosome 1.

M. G. Neuffer

7. A tandem duplication and an intrachromosomal displaced duplication induced by irradiation.

This project has been discussed in detail in previous reports. Simply, the procedure to obtain duplications is to irradiate diploid material which is heterozygous for two very closely linked markers in the repulsion phase and to select testcross progeny which have both dominant markers. This was done with A sh/a Sh kernels which were planted and crossed with a sh/a sh plants. The A Sh kernels produced were tested genetically for the presence of duplications. These kernels are of three types: (1) crossover cases, (2) trisomes--in which there has been nondisjunction and the constitution of the kernels is A sh/a Sh/a sh, and (3) duplications.

It was found that most of the A Sh cases were crossovers or trisomes. Irradiation greatly increases the frequency of nondisjunction. However, two cases of duplications have been isolated and cytologically identified.

The first is a tandem duplication (tDp3L a), which arose from a translocation between homologous chromosomes. It is a duplication of about 20% of the long arm of chromosome 3. There is generally a large buckle in the chromosome 3 pachytene bivalent. The exact nature of the duplication is unknown--i.e., whether the proximal segment carries the A sh markers and the distal segment carries the a Sh markers or vice versa. Genetic data for this duplication are presented in Table 1.