

mutant plastids which were restored to normal functioning by one or more restorer genes brought in by the pollen parent, the  $F_1$  plants coming from these zygotes should possess mutant plastids whose expression would be realized in  $F_2$  plants lacking the restorer genes. The ratio of green to white offspring would depend on the number of segregating restorer genes. The selfed  $F_1$  plants which segregated whites in the  $F_2$  would also be crossed as the pollen parent onto lines free of white alleles. None of the  $F_2$ 's from these outcrosses should segregate for white seedlings since normal plastids were contributed by the egg parent of the  $P_1$  generation. If these results are obtained it follows that irreversible plastid mutations are produced by iojap and that, even though they may be restored to normal activity by genic interaction, their intrinsic mutant quality is retained and becomes evident when the restoring alleles are lost.

M. M. Rhoades

7. Disturbed ratios due to semi-lethality of etched kernels.

Ears segregating for the etched allele, which is 12 units distal to A in chromosome 3, often have a deficiency of homozygous etched kernels. Deviation from the expected percentage varies in different genetic backgrounds; in some, no marked discrepancy is found while in others there is a significant reduction in the number of etched kernels. Tests were made to determine if the deficiency of etched is gametophytic or zygotic in nature. Crosses of A Et/a Et x A Et/a et pollen gave 1 : 1 ratios for the A:a pair so transmission of et pollen is normal. Crosses of A Et/a et by a Et pollen also gave 1 : 1 ratios for A:a so et megaspores are fully viable. However, the crosses of A Et/a et by a et showed that the deficiency of etched kernels is due to the deleterious effect of et on kernel development—i. e., etched acts as a semi-zygotic lethal. Etched kernels may abort early in development.

M. M. Rhoades

8. A test for recombination between the bt<sub>1</sub> and sh<sub>3</sub> alleles in chromosome 5.

Although the recessive mutants bt<sub>1</sub> and sh<sub>3</sub> differ markedly in their effect on kernel development, they are allelic. The compound bt/sh is similar in phenotype to sh homozygotes. The phenotypes produced by the two mutants are so unlike that their allelism was unsuspected for some time and was accidentally revealed through a chance cross of the two mutant strains. Differing as they do in

phenotype, it appeared plausible that they might represent mutations at different sites within the Bt cistron. Intra-cistron recombination between the two presumed mutant sites would produce + + and bt sh chromatids. The former would result in a plump kernel while the latter should yield a defective kernel which might be difficult to distinguish from bt homozygotes. However, plump kernels on an ear segregating for bt and sh would be easily recognized. It would appear that we have here an exceptionally favorable opportunity to test for intra-cistron recombination. Accordingly, hybrids of A<sub>2</sub> sh<sub>3</sub> pr/ a<sub>2</sub> bt<sub>1</sub> Pr constitution were pollinated by a<sub>2</sub> bt<sub>1</sub> pr by plants. The by mutant is the needed check on pollen contamination. The 1400 backcrossed ears obtained by carefully controlled hand pollinations gave a population of approximately 500,000 kernels. We have not found the plump kernels expected from recombination and indeed we found no plump kernels at all. This speaks well for our pollinating technique but unfortunately provides no evidence that the Bt<sub>1</sub> locus consists of mutant sites, separable by recombination.

M. M. Rhoades

#### 9. Pollen longevity.

Data from the concluding tests of a series begun in 1957 at Cornell indicate conclusively that corn pollen viability may be retained for varying periods of time under widely different conditions of storage. Pre-storage treatment of the pollen, in addition to temperature and humidity control during storage, have been shown to be critical. Optimum storage conditions have been shown to include the 10° range, 5° either side of 0° C. and a relatively high humidity.

Noteworthy results from two 1960 experiments show: 1) corn pollen viability (as measured by the production of seed) was retained for at least twelve days; 2) the viability was markedly enhanced at a controlled humidity of 75% compared to 25% or 50% at 5°C.

The conclusion is inescapable, and has been confirmed by several demonstrations, that the exchange of pollen among investigators is feasible. The shipment of viable pollen permits at least two applications: 1) the use of pollen at relatively great distances from the site of pollen production; 2) the exchange of genomes without the exchange of cytoplasm.

D. B. Walden