

The overall correlation coefficient of per cent oil of the parent kernels and per cent oil of the progenies was 0.857.

Comparisons of response to selection by classical recurrent selection for oil (destructive analysis and planting of remnant seed) and by a single kernel NMR-selection scheme suggests that progress should be about 2.25 times as rapid per generation by the latter scheme.

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4. Seed set in an autotetraploid maize synthetic.

Per cent seed set has been determined in autotetraploid syn B each year since 1958. The synthetic was maintained by selecting approximately 200-300 well filled ears from agronomically desirable plants each year as parents of the next generation. Each year seed set was determined in a random sample of 30-40 ears by determining the actual number of kernels on the ear and estimating the potential number from the kernel row number and a count of the potential kernels in a typical row. Mean per cent seed set for each year was:

1958	1959	1960	1961	1962	1963	1964	1965
60	68	74	69	78	80	69	83

Seed set has increased each year except for 1961 and 1964. Nineteen sixty-four was an adverse year for seed set which may account for the low seed set in this year. Improvement in seed set was rapid through 1962 but has since been slow, indicating that this synthetic is becoming stabilized at the autotetraploid level.

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5. Mutation rate of opaque-2.

Recent findings by Nelson, et al, (Science 1964) on the altered amino acid composition of opaque-2 endosperm proteins has stimulated the interest of corn breeders in the improvement of protein quality. Many breeders are presently converting inbred lines to the opaque-2 genotype. The backcross method is satisfactory for this conversion. However, if opaque-2 mutants could be obtained directly through spontaneous mutation, considerable time could be saved in developing opaque-2 versions of these lines.

With this in mind, an investigation of the mutation rate of the normal allele (O_2) to the opaque-2 allele (o_2) was conducted in 1965. The male sterile (T-sterile) versions of the lines B37, C103, M14, and W64a (Genotypes O_2/O_2) were used as female parents in an isolated crossing block.

The male parent was a homozygous opaque-2 stock. Any mutations of the normal allele to the opaque-2 allele can be detected in the F_1 seed, assuming no aberrant reproductive events. The following table summarizes preliminary results for three of the inbred lines. The results are based on the phenotypes of the F_1 kernels but verification of their genotypes will be made by crossing with a homozygous opaque-2 stock.

Table 1

	Inbred	Estimated No. Gametes Tested	No. Suspected Mutants	Rate
1.	C103	655,660	6	$.9 \times 10^{-5}$
2.	M14	1,043,077	6	$.6 \times 10^{-5}$
3.	W64a	1,118,665	2	$.2 \times 10^{-5}$

If these suspects are the result of mutation, then two conclusions are possible:

1. the mutation rate of \underline{O}_2 allele is comparable to that of other maize loci;
2. the mutational events of $\underline{O}_2 \rightarrow \underline{o}_2$ are frequent enough to warrant closer scrutinizing of inbred seed by corn breeders for these events.

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