

which take place infrequently before or at the beginning of meiosis and to a greater extent after meiosis.

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## 2. Study of the size of mutated sectors in the corn ear.

Mutagenic treatments of maize seeds were used in order to determine the significance of mutated areas on the ear.

For this purpose, plants derived from seeds of inbred line V7 treated with EMS (1.5 g/l) were detasseled and pollinated by  $\underline{sh}_2/\underline{sh}_2$  mutant V7. Observations were made on:

1.  $\underline{sh}_2$  mutated kernels on the ear of treated plants ( $M_1$ )
2. Chlorophyll mutants in  $M_3$  progenies obtained by selfing of  $F_1$  plants.

### Endosperm mutants.

Two ears of 486 harvested showed the mutation  $\underline{sh}_2$ . In the two cases, about 50% of the total kernels were  $\underline{sh}_2$ . Consequently those two ears are believed to be completely included in periclinal chimaeras (mutated area  $\geq$  ear size).

### Chlorophyll mutants.

Several types of mutant seedlings were observed in  $M_3$  progenies. Results from families showing 1, 2 or 3 different phenotypic mutants are summarized in Table 1. All progenies segregate with correct mendelian ratios.

The results indicate that:

1. If we consider the destiny of only one mutation, the frequency of segregating progenies per family (frequency of heterozygous embryos in the initial ear) is not significantly different from 50% in about 7 of the 13 studied families. In 5 families this ratio is significantly lower than 50%.

In the first group (including the two  $\underline{sh}_2/+$  mutated ears found in  $M_1$ ), the mutated sectors seem to be at least equal to the ear size, whereas in the second group they are smaller.

An aberrant case (H family, ratio  $> 50\%$ ) will be the subject of

Table 1  
Segregation of chlorophyll mutants following EMS treatment

Families (one from one ear M <sub>1</sub> )	1 mutation							2 mutations			3 mutations		
	A	B	C	D	E	F	G	H	I	J	K	L	M
M <sub>3</sub> observed progenies	51	59	57	48	50	50	52	58	35	31	26	24	29
M <sub>3</sub> segregated progenies	2(av) 5(av) 9(av) 17(av)*18(av)* 26(x)* 34(v)*							44(av) 17(v)* 11(av)* 2(v) 2(av) 5(a) 1(a,av)			4(xv) 2(ax) 16(x)* 3(v) 1(a) 15(a) 1(a) 2(a,ax) 2(xv) 3(v,a) 1(a,xv) 1(x,av) 1(x,xv)		

Types of mutations: a = albina; x = xantha; v = viridis; av = albo-viridis; ax = albo-xantha; xv = xantha-viridis

\*  $\chi^2$  ratio 1:1 non significant (P = 0.01)

further investigations.

2. In the "two mutations" cases, it is noted that one of the two mutated sectors is smaller than the other. This suggests that the two mutations did not appear simultaneously, but successively. The possibility of development of two contiguous sectors is not supported by our results.

3. The examples including three mutations show that the same ear can bring three mutations, or one cell can contain two viable mutations (ex: mixed progenies in the J, K, L, M families).

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1. The identity of South African maize germ plasm.

Most of the maize varieties grown in South Africa before the advent of hybrid maize can be traced to importations made in the first decade of the present century. According to the records given by Burt-Davy (1914) these importations were had from various sources abroad but all seem to have originated in the United States.

With the subsequent expansion of maize production as a commercial crop, the white dents became the dominant type, founded largely on a singularly restricted genetic base. The few varieties concerned were principally Hickory King, Champion White Pearl, Iowa Silver Mine and the Horse Tooth types. The yellow dents were less important but their origin is as clearly to be traced to American importations except that some of the varieties which later became popular showed infusions of flint sources. A number of flints were also imported but of these few became established varieties. In most cases, the early variety trials and farmers' reports referred to flint varieties named White and Yellow Congo, White and Yellow Botman with unspecified origin. Noticeably, both these varieties have both white and yellow variants. Burt-Davy (op cit) also refers to "Kaffir mielies" as being mixed white, red, blue and yellow flints grown in the Native territories. These flints, says