

used. The silks were cut off together with the uppermost part of the husks at various times after silking and pollinated on the following day. In Fig. 1, the kernels per ovule in percent, which were counted one month after pollination, were plotted against the time of pollination. The figure shows that the kernels per ovule rose until 4 to 6 days after the start of silking, then diminished gradually. The early rise in receptivity coincided with the increase in the number of silks emerged; the kernels usually crowded around the middle part of the cob following early pollination, while the filling of the tip with kernels was achieved by pollination at a rather advanced time. The silks were cut off at 1 cm above the husks and then pollinated. At various times after pollination, the silks were carefully removed from all ovules on the stripped inflorescences; then the inflorescences were wrapped again in husks and paper envelopes. The results were examined one month later. No kernels set on the ears where silks had been removed up to 12 to 16 hours after pollination, while the numbers of kernels increased as the time of removal of silks was prolonged. Since the curve in Fig. 2 roughly coincided with the cumulative frequency curve of silk length, the time necessary from pollination to fertilization may be proportional to the length of the silks.

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3. Mutation frequencies of five endosperm loci induced by u.v. irradiation of maize pollen.

Pollen grains of Tama (inbred flint stock), homozygous for \underline{Sh}_1 , \underline{Bt}_1 , \underline{O}_2 , \underline{Su}_1 , and \underline{Wx}_1 , were irradiated with ultraviolet light from germicidal lamps in a dark room under the following conditions, and stored within black vials placed in a cool environment:

Year	intensity (ergs/mm ² /sec)	dosage (ergs/mm ²)
1968	1080	1.8 - 4.5 x 10 ³

Four recessive tester stocks ($\underline{la} \underline{su}_1 \underline{Tu} \underline{gl}_3$, $\underline{a}_2 \underline{bm}_1 \underline{bt}_1 \underline{bv} \underline{pr}$, $\underline{o}_2 \underline{v}_5 \underline{ra}_1$, and $\underline{c} \underline{sh}_1 \underline{wx}_1 \underline{gl}_{15}$ in genotype, respectively) were pollinated by the irradiated dominant pollen. Immediately after pollination the treated ear was wrapped in aluminum foil for 24 hours, and the pollen was

prevented from photoreactivation except at the time of pollination when the pollen was exposed to daylight for only 15 to 30 seconds. The results for whole and chimeral mutations are separately shown in Table 1. The mutation frequency was the highest for \underline{o}_2 and progressively lower for \underline{su}_1 , \underline{wx}_1 , \underline{bt}_1 and \underline{sh}_1 . The higher frequency in the mutation of $\underline{Sh}_1 \underline{Wx}_1$ to $\underline{sh}_1 \underline{wx}_1$ was presumably caused by aberrations in the short arm of chromosome 9, because if mutations occurred independently in both loci, double mutations would have appeared in a much smaller frequency than the present value. The high \underline{o}_2 mutation may be due to the terminal position of the locus in the short arm of chromosome 7. However, the frequent mutations of \underline{Su}_1 would not support this hypothesis, because \underline{Su}_1 is near the centromere in chromosome 4. This locus may include some molecular elements sensitive to u.v.

Table 1
Mutation rates at five endosperm loci of maize pollinated
with UV-irradiated pollen grains in 1968

Mutation	Number of seeds set	Whole mutation		Chimeral mutation		Total ($\times 10^{-4}$)
		obs.	rates ($\times 10^{-4}$)	obs.	rates ($\times 10^{-4}$)	
$\underline{Su}_1 \rightarrow \underline{su}_1$	15283	59	41.30	113	79.18	120.40
$\underline{Bt}_1 \rightarrow \underline{bt}_1$	1252	2	15.96	7	55.97	71.87
$\underline{o}_2 \rightarrow \underline{o}_2$	15020	86	57.21	201	133.79	190.95
$\underline{Sh}_1 \rightarrow \underline{sh}_1$	12502	17	13.59	24	19.19	32.75
$\underline{Wx}_1 \rightarrow \underline{wx}_1$		19	15.19	74	59.18	74.34
$\underline{Sh}_1 \underline{Wx}_1 \rightarrow \underline{sh}_1 \underline{wx}_1$		24	19.99	29	23.19	43.18

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