

When this method was followed, Polar Vee responded to the gibberellic acid treatment showing increased final heights of 30%, 50% and 100% of controls with the concentrations of 10, 30, and 100 ppm, respectively. The Gaspé line showed an inverse response to concentrations, showing final heights of 100%, 60% and 6% with concentrations of 10, 30, and 100 ppm. No effects of the gibberellic acid treatment were observed with W₂₂ at the time the experiment was terminated.

Kinetin enhanced the growth of Gaspé and Polar Vee but its effect was less obvious in the W₂₂ variety.

All mononucleotides with the exception of cytidine 3' monophosphoric acid had some growth promoting effect. However, 5' nucleotides appeared to enhance growth more than the 3' nucleotides. Adenosine 5' monophosphoric acid and guanosine 5' monophosphoric acid had the greatest effect.

No conclusive growth differences were observed with any of the extract-injected plants.

Early indications suggest that none of these substances affects the flowering rate of maize; however, further studies are indicated.

Generally, the idea of empty endospermic sac injection seems a good one and may provide a good hormonal assay.

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1. Induction of mutants in maize pollen.

Pollen of inbred B14 was irradiated with gamma rays from a large Co⁶⁰ source stored in the pool of the reactor at the University. The corn was grown in 1972 at the Blandy Experimental Farm in Boyce, 90 miles away. Pollen was collected early in the morning, brought to Charlottesville for irradiation and returned to Blandy, where sib pollinations were made the same day. The pollen was irradiated in a container lowered into the water surrounding the Co⁶⁰ source to a depth determined to give an exposure of 1300 r. This was the most common

dosage used in previous experiments with developing corn plants, and one known to produce losses of dominant markers.

However, in the present study we are interested in mutations for seedling characters. This investigation is similar to the one where mutations were induced by treating maize seeds with thermal neutrons (Singleton 1969). In that experiment, 3.8% of the progenies tested segregated for some seedling character (42/1096).

In 1973, the sib-pollinated seed was grown at Blandy and several hundred self-pollinations were made. A severe bird infestation destroyed many of the ears, even though they were covered by pollinating bags. Only 140 ears were harvested. These were tested for seedling mutants by sowing 30 seeds from each ear in the biology department greenhouse in Charlottesville. Of those tested, two segregated in a monogenic ratio for mutants: one an albino, the other a yellow-green that seems to be different phenotypically from Y_E2 . Remnant seeds are available from this ear, No. 66. Also, 11 remnant seeds are available of progeny 103, the one segregating for albino seedlings.

The data are so limited that it is not possible to conclude that the mutants observed were really induced. However, this seems a more likely possibility than that the stock of B14 was segregating for these two mutants. Anyone wishing to study these may obtain what seed I have. I do not plan to grow any genetic corn this year.

Reference:

Singleton, W. R. 1969. Induced Mutations in Plants. International Atomic Energy Agency, Vienna, STI/PUB/231, p. 479-483.

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Table 1

Types and frequency of chromosome aberrations induced by BUdR (100ug/ml) + FUdR (5ug/ml)
at 25°C with concurrent exposure to UV (350mu; 51uW/Cm² x 100)

Fixation time (hr) after treatment	No. of meta-phases analyzed	No. (or %) of abnormal metaphases	Aberrations (per 100 cells)							
			Fragment at meta-phase	Fragment at anaphase	Centromere break	Chromatid break	Isochromatid break	Ring chromosomes	Despiralized chromosome	Endomitotic cell
5										
without UV	143	26(18.18%)	12.57	0.70	-	-	1.4	0.70	0.70	2.10
with UV	102	27(26.47%) ns	20.5	0.98	0.98	-	-	1.96	0.98	0.98
10										
without UV	117	46(39.31%)	26.49	0.85	-	1.71	2.56	-	0.85	6.83
with UV	159	78(49.06%) ns	40.25	3.77	1.26	2.50	-	-	-	1.26
15										
without UV	104	51(49.04%)	40.38	-	-	-	-	2.88	3.84	1.92
with UV	115	85(74.91%) **	52.17	-	4.35	12.17	-	1.74	-	3.48
20										
without UV	150	94(62.67%)	58.00	-	2.00	-	-	-	-	2.67
with UV	179	149(83.24%) **	62.56	-	0.56	6.14	1.67	2.23	1.12	8.94
25										
without UV	122	22(18.03%) **	18.03	-	-	-	-	-	-	-
with UV	157	94(62.56%)	62.56	-	-	-	-	-	-	-
Control	150	-	-	-	-	-	-	-	-	-

ns Not significant

** Significant at 1%