

Addendum:

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1. The change of some quantitative characters of maize by induced mutation.

Introductory remarks: In our induced mutation experiments we tried at first to change the protein content of maize (Bálint et al., 1962). On the basis of the results obtained, we began our investigations on the change of quantitative characters, which are interesting from an economic point of view.

During the course of our experiments we turned our attention to some published data, according to which smaller doses resulted in a greater mutational frequency for qualitative mutants. Therefore, we began to apply smaller doses to produce mutants in quantitative characters.

We employed on corn lines in 1961 the usual 15 and 7 kr x-ray, and in 1962, 15 and 5 kr gamma irradiation, hoping that the smaller doses would produce more variability in the offspring in relation to plus-variants than the usual treatment (15 kr). The  $M_2$  and  $M_3$  progenies which are at our disposal met our requirements for the most part of the characters.

Our newer experimental results: In 1963 we treated our C5 and T18 inbred lines with a 0.10% and 0.25% solution of EMS for 24 hours. The line C5 contained 10%, and T18 17%, protein. The germination rate of the latter was double that of the C5 line. The sensibility to EMS, therefore, is smaller than that of line C5.

Observations on 8 quantitative characters in the  $M_2$  generation were made the week following fertilization of the maize ears; for each treatment 150-200 plants were used. We constructed a variational chart for each character; then we set the most important value-number in the table (Table 1). The table shows that the values of the coefficient of variability are higher for the C5 line generally and tend to be higher in the T18 line with the mutagen treatment as compared to the distilled water control. With the C5 line we can also see that the lower concentration (0.10%) was more efficient than the higher one (0.25%) in broadening the variability.

Table 1  
Variability of Quantitative Characters in the M<sub>2</sub> Generation of Maize Treated with EMS

		Hatvan, 1964					
Characters	Mean and variability values	C 5			T 18		
		EMS (0.10%)	EMS (0.25%)	Dist. water	EMS (0.10%)	EMS (0.25%)	Dist. water
Plant height	$\bar{x} + m$	198.85+1.19	184.50+1.43	200.73+1.69	161.09+0.99	164.39+1.27	169.61+1.20
	$S\% + m_s\%$	10.12+0.42	8.67+0.55	8.28+0.59	11.85+0.44	10.42+0.55	9.69+0.50
Height of ears	$\bar{x} + m$	105.07+0.76	100.69+1.03	105.56+0.92	97.49+0.68	99.32+1.11	96.02+1.17
	$S\% + m_s\%$	12.12+0.15	11.42+0.73	8.54+0.62	13.26+0.49	15.01+0.78	16.61+0.86
Length of internodes	$\bar{x} + m$	12.59+0.08	11.42+0.10	12.36+0.11	10.50+0.07	9.81+0.09	10.15+0.10
	$S\% + m_s\%$	11.28+0.47	10.25+0.65	9.14+0.66	12.29+0.45	12.33+0.65	13.00+0.67
Leaf number	$\bar{x} + m$	11.56+0.05	11.53+0.08	11.67+0.03	11.10+0.06	12.24+0.09	12.26+0.10
	$S\% + m_s\%$	7.61+0.31	7.55+0.47	7.37+0.53	11.35+0.41	10.62+0.55	11.10+0.57
Length of tassels	$\bar{x} + m$	33.14+0.18	32.37+0.18	34.29+0.25	30.18+0.17	30.96+0.27	32.35+0.21
	$S\% + m_s\%$	9.08+0.38	7.48+0.47	7.26+0.52	10.90+0.40	11.76+0.62	8.75+0.45
Number of branches in the tassel	$\bar{x} + m$	14.93+0.31	14.84+0.47	18.82+0.55	22.43+0.37	21.84+0.41	24.14+0.46
	$S\% + m_s\%$	35.96+1.50	35.34+2.23	28.91+2.07	31.70+1.17	25.23+1.32	25.76+1.33
Length of ears	$\bar{x} + m$	16.40+0.14	16.32+0.15	16.69+0.22	18.00+0.14	18.02+0.20	19.43+0.18
	$S\% + m_s\%$	13.05+0.59	8.27+0.64	9.89+0.94	14.17+0.55	14.87+0.79	11.84+0.64
Row Number on the ear	$\bar{x} + m$	16.24+0.13	16.62+0.21	17.19+0.23	15.21+0.10	15.56+0.16	14.89+0.11
	$S\% + m_s\%$	11.82+0.56	10.41+0.89	9.94+0.93	11.11+0.44	13.56+0.72	9.94+0.54

With the T18 line, this does not seem to be true. Some characters (leaf number) are slightly, others (for instance, height of the plant) are strongly mutable. Considering the average values, the 0.25% EMS treatment generally gives lower values in relation to the control than does the 0.10% EMS treatment.

- Summary:
1. EMS treatment increased the variability of 8 investigated quantitative characters in the M<sub>2</sub> progeny of C5 and T18 inbred lines of maize.
  2. In the C5 lines, the 0.10% concentration of EMS was more effective than the 0.25% concentration in changing the variational latitude.
  3. The different quantitative characters do not react uniformly upon mutagen treatment.

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1. B-chromosomes in the Oriental Maydeae.

Supernumerary or B-chromosomes have been reported and studied extensively in the New World Maydeae, maize, teosinte and Tripsacum (c.f. Randolph in Corn and Corn Improvement, pp. 18-19, 1955). In studies of several populations of Oriental Maydeae, we have encountered B-chromosomes in Coix aquatica (n=5) and Chionachne koengii (n=10). In the Coix material two populations, one from Madhya Pradesh and the other from Orissa, exhibited two B-chromosomes in a proportion of plants. The two chromosomes always paired within themselves and organized a single bivalent at meiosis which was more heteropycnotic than the regular A-chromosomes. The B-chromosomes did not show any synaptic relationships with the A-chromosomes.

In two populations of Chionachne koengii from Maharashtra and Andhra Pradesh, B-chromosomes varying from one to two per plant were observed. In crosses