Table 3

Standard deviation estimates for the nuclear cycle in root tips of *Zea mays* L. (Seneca 60) treated with cycloheximide and chloramphenicol (hours)

Phase	25°C			30°C		
	Control	Cyclo-heximide	Chloram-phenicol	Control	Cyclo-heximide	Chloram-phenicol
G_1 + M	0.31	0.37	0.15	0.20	0.50	0.52
S	0.22	0.14	0.07	0.33	0.51	0.13
G_2 + P	0.10	0.30	0.23	0.21	0.36	0.23
Total N.C.	0.40	0.49	0.18	0.36	0.71	0.59

M = Prophase + Metaphase + Anaphase + Telophase

P = Prophase

N.C. = Nuclear Cycle

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9. Changes in mitotic index induced by cycloheximide and chloramphenicol.

In addition to the effect noted in the previous note, we were able from the same experiments to record the data necessary to compute the mitotic index (MI). For each experiment, cycloheximide (0.001%), chloramphenicol (0.03%) and control, the MI was determined. The values are recorded in Table 1.

The decrease in the mitotic index to 1.5% was apparent between 1 and 4 hours (i.e., 3 to 6 hrs after pulse, accounting for the 2-hour treatment period) after treatment with cycloheximide or chloramphenicol; it remained at this level for up to 6 hours, at both temperatures and with both chemicals. Thus, the mitotic indices are affected immediately even during the incubation period. If roots were treated with chloramphenicol at 30°C, the mitotic indices reached the control level in seven hours; in the case of cycloheximide (30°C), the control level was reached

Table 1

Mean mitotic indices (with standard deviations) from treated and untreated primary root-tips of 'Seneca 60' stock at 25° or 30°C

Hrs. after pulse	Control		Cycloheximide (0.03%)		Chloramphenicol (0.001%)	
	25°C	30°C	25°C	30°C	25°C	30°C
1	6.3 ± 0.82	3.1 ± 0.54				
3		3.1 ± 0.62	5.58 ± 0.47	3.08 ± 0.27	2.46 ± 0.30	3.23 ± 0.31
5	10.8 ± 0.70	6.2 ± 0.51	5.59 ± 0.53	1.24 ± 0.25	2.24 ± 0.28	2.06 ± 0.27
7	8.2 ± 0.62	5.8 ± 0.74	3.35 ± 0.26	1.26 ± 0.20	1.61 ± 0.22	5.96 ± 0.37
9		6.2 ± 0.74	4.12 ± 0.31	4.91 ± 0.51	6.60 ± 0.35	4.71 ± 0.32
10	8.9 ± 0.64					
11			7.49 ± 0.85	4.97 ± 0.36	6.50 ± 0.44	6.20 ± 0.34
12		6.2 ± 0.89				
13			7.32 ± 0.46	4.98 ± 0.41	5.30 ± 0.35	5.81 ± 0.34
14	9.8 ± 0.74					
15			4.06 ± 0.42	6.30 ± 0.73	5.24 ± 0.34	7.14 ± 0.52
17			7.01 ± 0.43	7.57 ± 0.42	5.33 ± 0.33	3.03 ± 0.25
18	9.2 ± 1.00					
19			6.54 ± 0.40	5.67 ± 0.35	5.60 ± 0.38	6.10 ± 0.41
21			7.12 ± 0.45	5.10 ± 0.34	6.49 ± 0.36	6.20 ± 0.35
23			6.80 ± 0.44	5.24 ± 0.40	6.50 ± 0.42	5.36 ± 0.42
25			8.59 ± 0.49	4.23 ± 0.23	7.62 ± 0.40	
27			5.90 ± 0.36			
30			6.80 ± 0.37			
Temperature mean	9.1 ± 0.29	5.3 ± 0.28	5.68 ± 0.45	4.54 ± 0.38	5.12 ± 0.10	5.07 ± 0.10

in nine hours. At 25°C, mitotic indices did not reach the control level even after 30 hours in both experiments.

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10. The effect on the nuclear cycle of mitomycin C and the production of chromosomal aberrations.

The purpose of the present study was to examine the effect of mitomycin C (MC) on the nuclear cycle and to record from metaphases of similar experiments the frequency of chromosomal aberrations assignable to specific chromosomes. Seeds of "Seneca 60" were germinated and grown at 24 ± 1°C on filter paper kept moist with distilled water. Germinated kernels with roots about 2 cm. in length were used for these experiments. Intact roots were exposed to H^3-thymidine (1 μc/ml final concentration) for 30 min., washed thoroughly, and treated with 0.001% MC for 2 hrs., following which the roots were washed in water again. After the last washing, the root tips were returned to the germination chamber for further growth and fixed at 2-hour intervals up to 36 hrs. post-treatment. Liquid emulsion autoradiographs (Kodak NTB-2) were prepared from Feulgen squashes of this material. Slides were scored for the frequency of labelled mitotic figures and the mitotic index was calculated. For each collection period, 3 or 4 root tips were examined to give a population of $6 - 8 \times 10^3$ cells.

In the experiments with MC, we did not accumulate metaphases by addition of colchicine, any other chemical, or cold; consequently, normal anaphase cells were also observed. Apparently, MC does not affect spindle formation during mitosis. However, a reduction in the mitotic index was recorded after MC treatment, suggesting that there was an immediate delay in the rate at which cells entered mitosis (Table 1). The relation between mitotic index and prophase labelling at various times from the beginning of MC treatment indicated that mitotic index was affected immediately even during the incubation period. Within the 14 to 18 hour period after the beginning of MC treatment, the mitotic index had decreased to about 1% (9.53% in control, Table 1), which in turn indicated that those nuclei were in a very early S period.