Roots of 'Seneca 60' (Chen, 1969) were incubated in 0.002M 8-OHQ for 3 hours, washed thoroughly, and returned to the germination chamber (25°C) for further growth. Tritiated thymidine (1 uc/ml final concentration) was applied for 30 minutes to the previously 8-OHQ treated roots in a series of treatments at 2-hour intervals for 22 hours; that is, a total of 12 different treatments over the 22 hour period was collected, such that each treatment was a specific hourly increment from 0 hour, the time at which the roots were removed from the 8-OHQ incubation and the wash initiated.

The root tips were processed for smearing as reported earlier (Chen 1969) and autoradiographs were prepared according to the schedule of Douglas (MGCN 42: 175-178, 1969). For each treatment and control, the mitotic index and labeling index were determined.

Preliminary results indicate that both mitosis and ^{3}H uptake are affected by 8-OHQ. The mitotic index was affected immediately, during the incubation period. Within the two to eight hour period after 8-OHQ incubation, almost no division figures were observed. Mitosis resumed after eight hours and reached the control level at 12 hours. 8-hydroxyquinoline inhibited but did not completely stop ^{3}H uptake. The labeling index decreased slowly in the first six hours after 8-OHQ incubation then sharply thereafter reached a minimum (15%) in 8-10 hours. After 10 hours, the labeling index began to increase and control ^{3}H uptake was recovered in 14-16 hours.

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4. Nuclear cycle in Zea mays L. root tips.

In MGCN 43: 186-190 (1969) we reported the duration of the nuclear cycle in root tips of 'Seneca 60' at 20°, 30°, and 35°C. These earlier investigations have been extended to 25°C. The increments in S, G_2, and M indicated that the cycle components retain a relationship at 25°C proportional to the same components at the other temperatures. However, the

Table 1

Frequency of nuclei scored from root tips following pulse labeling (^{3}H-thymidine, 30 minutes), 25°C

Class	'Seneca 60'		'Chromosome 9 Tester'	
	Long Root	Short Root	Long Root	Short Root
Interphase				
Labeled	30281	30828	23032	19529
Prophase				
Labeled	909	1589	1171	1086
Unlabeled	1342	1868	1014	1340
Metaphase				
Labeled	299	547	417	355
Unlabeled	629	865	488	681
Anaphase				
Labeled	70	151	85	87
Unlabeled	151	218	121	144
Telophase				
Labeled	382	572	402	381
Unlabeled	871	896	438	682
Total	34934	37534	27168	24285

Table 2

Duration of the nuclear cycle in the root tips of Zea mays L. (25°C).

Phase	'Seneca 60'				'Chromosome 9 tester'			
	Long Root		Short Root		Long Root		Short Root	
	hrs.	%	hrs.	%	hrs.	%	hrs.	%
Interphase								
G_1	1.08	11.1	2.00	19.9	1.50	15.0	2.56	24.1
S	5.10	52.0	5.00	50.5	4.70	48.0	4.50	42.5
G_2	2.81	28.7	1.80	18.5	2.70	28.0	2.43	23.0
sub-total	8.99	91.8	8.80	88.9	8.90	91.0	9.49	89.6
Mitosis								
Prophase	0.39	4.0	0.57	5.7	0.50	4.7	0.57	5.3
Metaphase	0.16	1.6	0.23	2.3	0.20	1.9	0.24	2.3
Anaphase	0.04	0.4	0.06	0.6	0.04	0.5	0.05	0.5
Telophase	0.22	2.2	0.24	2.5	0.17	1.9	0.25	2.3
sub-total	0.81	8.2	1.10	11.1	0.91	9.0	1.11	10.4
Total	9.80		9.90		9.81		10.60	

calculated values for G_1, yielding negative numbers, required further investigation. We considered three factors:

i) the labeling time (duration of pulse);

ii) misclassification of prophase and background label;

iii) the length of meristematic region of the root tip included in the study.

In an attempt to broaden the scope of this study, a second stock (a chromosome 9 tester) was added. Employing Chen's (1969) methods, two root tip lengths ("long" = 2.40 ± 0.08mm and "short" = 1.52 ± 0.02 mm) were studied at 25°C. All slides from each treatment were coded and scored blindly. The classification data are presented in Table 1 and the new interphase and mitosis estimates at 25°C are presented in Table 2.

The data revealed no differences in the nuclear cycle of the two stocks. Likewise, the data did not reveal major differences between root preparation techniques. The duration of mitosis and its components, and the S period, are unaltered from our earlier estimates (MGCN 43: 186-190, 1969). However, the calculations of G_1 and G_2 yielded new estimates. G_1 and G_2 were partitioned from the residual of the interphase minus S interval; it follows logically that a change in G_1 in one direction will alter G_2 in the opposite direction in so far as we employ the proportion method. Since G_1 and G_2 are derived values from the slopes of the curves, it is clear that the alterations we made in our protocol are responsible for the changes recorded (Table 2) for G_1 and G_2.

We have reduced our acceptable labeled cell from 4 x background to 2 x background. Coupled with a more critical classification of prophase, we feel that this modified protocol more accurately represents the nuclear cycle in maize root tips.

R. S. Verma

5. Chromosome replication profiles from maize root tips.

In MGCN 43: 190-192 (1969) we reported preliminary data from a study of the replication behavior of individual maize somatic chromosomes at 28°C in a chromosome 3 tester stock in which each cell contained one