2. The relationship among leaf number, leaf width, and cell number in ABPHYL.

We reported earlier (MGCNL 41: 197 and MGCNL 42: 169-172) some features of an "opposite leaf" phenotype. Since considerable variability in its expression has been observed, we have renamed the phenomenon "ABPHYL", for ABerrant PHYLlotaxy. Besides confirming our previous observations, our recent observations have concentrated on the number and width of leaves produced by variants. Segregations through the F_5 have continued to confirm previous observations.

We now know that ABPHYL can be expressed at any time from embryo to tassel initiation. In addition, plants have been observed with up to four times more leaves than would be normally expected. Most frequently, however, and especially so in those plants where leaf arrangement is decussate, leaf number is twice the normal number. Leaves from ABPHYL plants most frequently are one-half the width of normal leaves but since length is not significantly different, total leaf area would be expected to be similar. Preliminary measurements support this expectation. Leaves are narrower in ABPHYL due to fewer and not narrower cells.

Thus we now interpret the ABPHYL genotype as expressing itself, at least in part, at the shoot apex through modification of the rate of production, siting and size of leaf primordia. Since some crosses tend to accumulate different features of this genotype, we feel that certain desirable features of this system can eventually be stabilized into a single non-variable expression.

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3. Effects of 8-hydroxyquinoline on mitosis in maize root tips.

Our protocol for collecting metaphase spreads for eventual use in studies requiring chromosome identification includes incubation of roots in 0.002M 8-hydroxyquinoline (8-OHQ) for 3 hours. Excellent chromosomes and a relatively large number of metaphase spreads is collected by the action of this chemical. However, we were concerned about possible additional effects of 8-OHQ on the cells. From the experiment described below, we have been able to ascertain the effect of 8-OHQ on mitosis.

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